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ABSTRACT

One hundred and eighty school personnel held a workshop with representatives of the petroleum, natural gas, and electrical power industries. The objectives of the workshop were (1) to provide participants with a common body of knowledge and a common understanding of the energy crisis and its implications for the public schools, (2) to delineate procedures that school districts can use to conserve energy, and (3) to identify problems and problem areas created by the energy shortage and to seek solutions through cooperative planning. After a general session, participants were divided into sixteen small groups. Nine of the groups utilized a brainstorming technique to identify solutions to problems in the areas of transportation of pupils, administration, regular classrooms, specialized classrooms, classroom uses outside the regular school day, extra curricular activities, maintenance, and food services. The remaining groups incorporated problemsolving techniques into their responses to the following hypothethical situations: delay in delivery of instructional supplies, blackouts, diesel fuel reduction, gasoline reduction, natural gas reduction, electrical power reduction, and increase in bus riders. A bibliography of additional reference materials is provided. (Author/MLF)

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THE ENERGY CRISIS IN THE PUBLIC SCHOOLS:

ALTERNATIVE SOLUTIONS

EA 006 693

$2.00

Ventura County Superintendent of Schools
County Office Building
Ventura, California 93001
Dr. JAMES F. COWAN, Superintendent

INTRODUCTION

The public schools are faced with a limited source of energy in the immediate and distant future. This perplexing but persistent fact threatens the primary function of the public schools --- the provision of quality educational programs to students.

On January 22, 1974, a problem-solving workshop was held in Ventura to identify alternative solutions to problems posed by the energy crisis in the public schools. One hundred and eighty school administrators, classroom teachers, and directors of transportation, food service, and maintenance and operations met with representatives of the petroleum, natural gas, and electrical power industries. The specific objectives of the workshop were:

1. To provide participants with a common body of knowledge and a common understanding of the energy crisis and its implications for the public schools.
2. To delineate procedures that school districts can use to conserve energy.
3. To identify problems and problem areas created by the energy shortage and seek solutions through cooperative planning.

The morning session was devoted to the first objective. Information was provided to the participants by **Mr. J. L. Pauley**, Getty Oil Company; **Mr. bill Cross**, Southern California Gas Company; and **Mr. Jack Morrison**, Southern California Edison Company.

During the afternoon, the participants were divided into sixteen small groups. Nine of the groups utilized a brainstorming technique to identify solutions to problems in the areas of Transportation of Pupils; Administration, Offices and Plant; Regular Classroom; Specialized Classrooms; Classroom Uses Outside the Regular School Day; Extra Curricular Activities; Maintenance, Operations and Grounds; and Food Services.

The seven remaining groups incorporated problem-solving techniques into their responses to seven hypothetical situations as a result of a Delay in Delivery of Instructional Supplies; Blackouts; Diesel Fuel Reduction; Gasoline Reduction; Natural Gas Reduction; Reduction in Electrical Power; and Increase in Bus Riders.

This handbook includes the creative thought provided by the workshop participants and a bibliography of additional reference materials. While all participants deserve credit for contributing to the handbook, and are identified in other portions of the handbook, a special note of appreciation is extended to **Dr. Wilmar Grossbach** and **Mr. William Shaffer**, two of my staff members who organized and directed the workshop and prepared and edited the handbook.

James F. Cowan, Ed.D.
County Superintendent of Schools

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GENERAL

Many energy-saving ideas that were recommended had application to all areas and problems. As the material was edited, suggestions of a general nature were assembled into this category.

An analysis of the recommendations indicates that most of the ideas are not only energy-saving plans but implementation of them will materially reduce the cost of operating educational programs with little or no reduction in effectiveness.

1. Assign to a member of management the responsibility for coordinating all energy conservation programs and establish a program for reporting progress regularly.

2. Establish an energy conservation committee that recommends methods and evaluates suggestions.

3. The school's attitude toward energy conservation, from the school board through students, is the most effective way to achieve total energy savings. The attitude from the top will effect all members of the school community. Design programs to develop proper attitudes.

4. Involve students, faculty, and staff in developing and implementing programs to reduce the use of energy. Invite and encourage suggestions.

5. Involve building engineers fully in reducing use of power and fuel. Show them each monthly bill and graph results of energy-saving programs so they can see the progress being made. Building engineers can do more than anyone to reduce utility usage once they see their efforts are really paying off.

6. Design incentive programs so that the students and staff can get benefits from saved energy and saved money.

7. Establish rules and regulations for the conservation of energy that involves everyone and considers every facet of the school community. Show no partiality.

8. Develop a program of strict controls on renting or leasing schools or rooms for non-school activities.

9. Set standards high because they deteriorate as they go down the line to the worker.

10. Strong, positive board and administrative bulletins are necessary.

11. Develop information programs and procedures that keep everyone in the school community constantly aware and concerned about waste of power and fuel.

12. Adequately publicize and give credit for programs that are proving effective in reducing energy through flyers, monthly bulletins, newsletters, etc.

13. Design and print attractive, eye-catching signs about saving energy and put them in appropriate places.

14. Do an audit of energy consumed for the past three years. Use this audit for comparative purposes.

15. Use computers to develop a profile of energy consumption in school facilities to identify energy use factors. Use this to make comparisons of total energy cost per square foot of building space, electric consumption cost per student, gas consumption per cubic foot of building volume, and other parameters for each school or building.

16. Check utility bills for each school building to make certain no irregularities exist.

17. Recognize that operations and maintenance are two separate functions. Do not expect untrained, unskilled personnel to repair and maintain sophisticated equipment.

18. All systems and equipment must be maintained at peak efficiency. Establish a planned preventive maintenance program and make sure it is carried out.

19. Bring staff up to level of skill demanded by the equipment and controls. Establish an inservice training program for custodial and maintenance staffs. Utilize manufacturing representatives who can give instructions in operating pieces of equipment at maximum efficiency.

20. Train custodians to be "low-echelon" maintenance men, capable of recognizing when something needs adjustment or repair and to know the proper person to call immediately.

21. Arrange for maintenance contracting in highly specialized areas that includes checking of equipment, conducting preventive maintenance tests, making adjustments, and responding to emergencies.

22. Install monitoring devices on equipment that use large amounts of energy which, when improperly maintained, will sound alarms or shut the equipment down until the deficiency is corrected.

23. Manuals and operating instructions must be developed for every piece of equipment that uses energy. The manual should not only tell proper operating functions, but warn of malfunctions. This information should be readily available to all operators.

24. Redesign, remodel, or replace worn out, inefficient or obsolete equipment and systems.

25. Run equipment, which is used irregularly, on an on-call or as-needed basis.

26. Speed up laundry equipment to complete its work as quickly as possible. Many school washers are set on a longer time cycle than needed for cleaning lightly soiled towels or uniforms.

27. Resolve the conflict between simplicity of equipment and controls and the conservation of energy.

28. Carefully develop specifications for the purchase of new equipment to ensure that it is designed to use the minimum amount of energy.

29. Do not buy inexpensive and inferior equipment to save money on the initial cost if you know it will use more fuel or electricity to operate it.

30. Reschedule district calendar to minimize school operations in cold, high energy consuming seasons. Add a second or third winter vacation. The lost days can be made up by shortening spring vacation or, in non-air conditioned schools, by adding a few days at the end of the academic year.

31. Alter daily schedules for maximum daylight hours and warmest temperatures.

32. Develop curriculum units that help students understand the energy problem and elicits their cooperation.

33. Increase the size of classes with team teaching, use of aides, etc.

34. Unify or consolidate small school districts to provide better use of facilities, equipment, and energy-saving operations.

35. Work with city and county planners to speed up bicycle lanes.
Provide adequate and safe parking areas for bicycles at schools and offices.

36. Encourage employees and students to bring their lunches rather than driving home or to a restaurant.

37. Eliminate aesthetic, holiday, and decorative energy-using programs and devices.

38. Utilize every possible organization, association, and industry in developing programs to conserve energy.

39. Eliminate as many meetings and conferences as possible.

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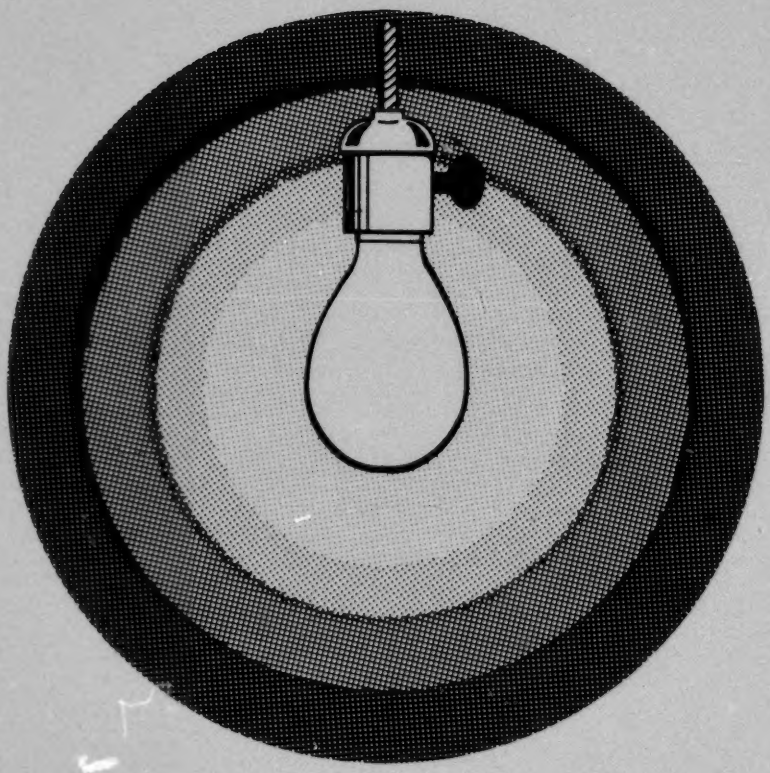
ELECTRICITY AND LIGHTING



Sixty percent of an average-sized school's electrical energy consumption is used for lighting. Air conditioning consumes a large portion of the remainder. Lighting levels for most educational functions have tripled since 1950. Air conditioning is becoming standard in much of today's new construction – regardless of its need.

1. It is recommended that a serious reexamination of IES recommended lighting standards take place. The average recommended light level was 20 foot candles until 1958. This report suggested 70 foot candles as a minimum. This minimum was based on a very specific task.The minimum not only requires more light than is needed for reading, but also limits lighting to one level throughout class areas and completely ignores non-reading activities such as storytelling and physical activity.

2. Involve building engineers fully in reducing use of electricity. Have them evaluate each monthly bill and graph results to determine the progress being made. They can do more than anyone else to reduce electricity usage once they see their efforts are really paying off.

3. Resolve the conflict between simplicity of equipment and controls and the conservation of energy.

4. Carefully develop specifications for the purchase of new equipment to ensure that it is designed to use the minimum amount of energy within the requirements of performance, longevity, and maintenance.

5. Control purchasing of equipment to obtain the correct voltage and horsepower. Purchase electric motors of the proper horsepower and proper voltage. Running motors that are under full capacity can lead to as much as a 25 percent power waste.

6. Redesign, remodel, or replace obsolete or inefficient equipment.

7. Inspect all light bulbs to ensure they are of the minimum voltage needed.

8. Use diffusers, new lens, polarizers, and special beam distributor units that can provide proper spread, focus, and use of illumination within a given space.

9. Replace all outdoor and gymnasium lights with mercury vapor lamps.

10. Replace incandescent lighting with fluorescent or mercury vapor lighting, which will reduce power, improve lighting, reduce vandalism, and reduce labor required to change bulbs.

11. Replace lamps on a regular basis. Fluorescent tubes should be changed after 80 percent of their lamp life is used. Research indicates that fluorescent lamps use more energy and produce less light during their last 20 percent of life.

12. Clean fluorescent tubes regularly. A tube will collect enough dust and dirt to reduce efficiency by 10 to 12 percent in 6 months and 40 percent in two years.

13. Operate fluorescent lamps at higher alternating current frequencies (3000 rather than 60 cycles per second).

14. Place mirrors behind lights to reflect more light.

15. Use mirrors outside classroom to reflect outside light and heat into rooms.

16. Ensure that all electrical connectors are properly soldered. Some electricity is lost by cheap connections.

17. Equipment which is used irregularly, should be used on an on-call or as-needed basis.

18. Lower the temperature setting for hot water that is heated electrically to the lowest acceptable level determined by building codes.

19. Turn off or reduce to lowest possible level all electric hot water heaters after school hours except for those needed for athletic or other special events.

20. In areas such as laundries, speed up equipment so as to complete the work in fewer hours.

21. Schedule major electrical power-consuming operations, such as pumping water into storage tanks, during off-peak hours.

22. When a learning unit is going on in the classroom that does not require light, reduce or shut off lights.

23. Reduce lighting levels in cafeterias.

24. Reduce lighting in hallways, corridors, storage areas, and outside the school to the lowest level safety and security will allow.

25. Eliminate or reduce lights in holiday, aesthetic, and other special school displays.

26. Reduce lighting levels in gymnasiums and auditoriums and turn off lights when not being used.

27. Energy consumption can be cut by a large percent by having the lights on from 8 a.m. to 5 p.m. rather than 24 hours a day. The fluorescent tubes need to be replaced only once every four years compared to every 18 months when on continuously.

28. When custodians are cleaning buildings at night, insist that they have lights on only in the rooms they are cleaning. When a cleaning task in a room has been completed, the lights should be turned off. Schedule daylight cleaning when possible.

29. Work with community groups to curb vandalism in lesser lighted areas.

30. Outside security lights should be only bright enough to illuminate the areas needed.

31. Rotate night security illumination.

32. Put lights on timers, photo cell, or astronomical clocks that turn lights off at given hours.

33. Check the sensitivity of automatic light controls to ensure they are not triggered by fog or clouds passing over the sun.

34. Reset automatic timers for lights on a weekly basis to utilize all available daylight.

35. Turn off lights when room is not in use.

36. Put a bright orange card over switches left on:

> This Switch was Found
>
> ON
>
> After Room was Closed
>
> Electricity has been
>
> WASTED
>
> Please
>
> TURN OFF SWITCH
>
> When Leaving Office
>
> Do Not Use Electricity
>
> UNNECESSARILY
>
> at Any Time

37. Turn off electric typewriters and other clerical and bookkeeping equipment when not in use.

38. Reduce use of appliances - coffee pots, room heaters, etc.

39. Don't preheat electric ovens more than is absolutely necessary. In many cases, preheating is not necessary.

40. Eliminate or reduce night football games and reschedule them during the day. If varsity football schedules cannot be changed, use only one bank of lights for pre-game and half-time shows.

41. Restrict use of parking lot lights to nights when events are held at the school.

42. Provide facilities that are the proper size that the group needs. Do not assign rooms or buildings that are too large.

43. In multi-story buildings, insist that employees and students walk up two stories and down three stories.

44. Increase the size of classes with team teaching, use of aides, etc.

45. Paint rooms and dividers with colors that reflect light. Keep walls, ceilings and dividers clean; dark colors and dirt can reduce illumination by as much as 40 percent.

46. Break corridor lighting into sections and place each section on timers to come on at the exact time school is opened and shut off at a specified time after school is out. Ensure that the timers in each section can be overridden to allow operation of only those sections needed for activities.

47. Install a number of separate lighting circuits or dimmers for areas where high levels of lighting are needed only periodically.

48. Install switches in rooms so that lights near windows can be turned off when there is sufficient natural light in that area.

49. Sub-meter electricity so that a true charge by department can be determined. Hold each department accountable.

50. Use windmills to generate electricity.

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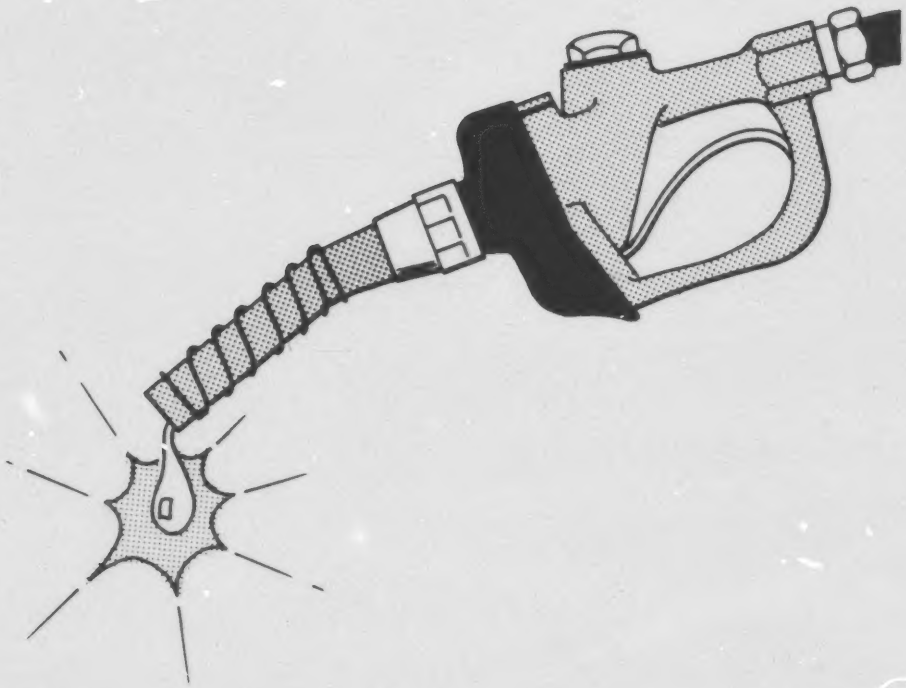
GASOLINE AND DIESEL FUEL



The primary use of diesel fuel is in school buses used for transporting children to and from school, on educational field trips and for intra and interscholastic activities. School buses also use the major portion of gasoline consumed by school districts.

Another use of gasoline is for the operation of trucks, power mowers, grass edgers, sweepers and other maintenance and operations equipment.

An additional use of gasoline is transporting employees to meetings and conferences both inside the district and to other locales. A large amount of gasoline is used by employees and students for commuting purposes.

1. Lock gas tanks to avoid theft.

2. Drive slowly and easily the first few miles until vehicle warms up.

3. Keep gas tanks full to avoid excessive evaporation.

4. Ensure that vehicle tires are properly inflated or to the maximum safety level. Soft tires increase gas consumption.

5. Reduce speed limit to as low as practical.

6. Avoid full throttle operation.

7. Monitor use of all vehicles.

8. Increase frequency of driver inservice programs.

9. Train drivers to use pre-planned starts and stops.

10. Install trip recorders to record driver and vehicle operation. Use this information to reduce use of gas and oil.

11. Use modern analyzing equipment to ensure fuel and oil economy for all vehicles.

12. Develop an information exchange of ideas on fuel conservation between districts and with industry.

13. Evaluate the possibility of satellite vehicle parking stations at the extremities of districts to avoid "deadheading" back to centralized garages.

14. Develop innovations and creative programs to encourage students and staff to walk to school or ride bikes. Furnish adequate bike racks. Provide adequate safety for bikes from theft and vandalism.

15. Get the student council to develop programs to encourage walking, bike riding, or car pools for students.

16. Encourage student car pools by eliminating parking passes unless four students ride in one car.

17. Use an incentive system for reducing vehicle fuel consumption.

18. Provide assistance in developing car pools for teachers and clerical help in schools.

19. Tune and maintain engines on all vehicles to peak performance. Correct faulty spark plugs, points, and carburetion.

20. Return to the neighborhood school concept where all students walk to school.

21. Consolidate and increase size of schools, reducing the number of campuses. Use double sessions at centrally located schools.

22. Increase walking distances for students.

23. Relocate special education classes to neighborhood walking schools or centralize special classes in one location to avoid excessive transportation.

24. Review special programs to determine need for transportation. Are some special education students being bused that could walk?

25. Enter into interdistrict attendance agreements with other districts if excessive bus travel can be avoided.

26. Change attendance boundaries to reduce transportation.

27. Reduce or eliminate all but the most necessary athletic contests.

28. Reduce or eliminate all but the most necessary field trips.

29. Combine field and athletic trips from more than one school.

30. Have districts share buses when holding athletic events.

31. Establish minimum and maximum distances for field trips and athletic trips.

32. Limit field trips to full bus loads only.

33. Combine athletic schedules so several games can be played at the same tim .

34. Go to a four-day school week, thereby saving one day's driving of buses.

35. Consolidate beginning and ending times of all schools, including special education programs. Minimize or eliminate staggered school schedules.

36. Reduce school year to minimum number of days.

37. Encourage parents to pool with other parents in transporting children to school for late activities and for extra curricular events. Provide professional help if additional insurance coverage is needed by parents. Arrange for low cost premiums. Consider having the district assume some of the insurance costs.

38. Contract with parents to provide transportation.

39. Use charter and public transportation.

40. Connect schools with cable TV or closed circuit TV for instruction, inservice meetings, and reports.

41. Use the smallest practical vehicle for long-distance, light-load runs.

42. Coordinate and consolidate pick-ups, deliveries, and messenger service between schools through the central office.

43. Make warehouse deliveries to schools on a very minimal basis.

44. Combine deliveries with bus routes. Use buses for deliveries.

45. Avoid courtesy stops.

46. Explore the satelite concept where classrooms are located away from a central campus. Rent unused houses, churches, and other buildings.

47. Use school buses for public service.

48. Pick an area for staff meetings that requires the least amount of driving for all concerned. Insist on car pools.

49. Adopt policy for all trips by employees to meetings, conferences, conventions, etc. Limit amount of mileage allowance. Establish policy on distance to walk to meetings.

50. Request that all district employees form car pools when traveling on official business.

51. Coordinate conferences out of district for sharing rides. Use central place as place of embarkation.

52. Utilize conference phones as substitutes for small meetings.

53. Use phone calls instead of home calls.

54. Install two-way radios to direct operation or redirection of district vehicles to reduce mileage.

55. Have district personnel, who serve a number of schools, coordinate trips to include as many stops as possible and include other district personnel serving the same schools.

56. Coordinate transportation with other public agencies.

57. When parents are doing errands have them contact nearest school to perform service along route they are traveling. Put in a drive-up window at school.

58. Have parents come to school to take sick children home.

59. Encourage all employees to ask themselves the following questions before undertaking a trip: Can someone else do it who is going that way? Can I deliver something for someone else? Can I do it on the way home?

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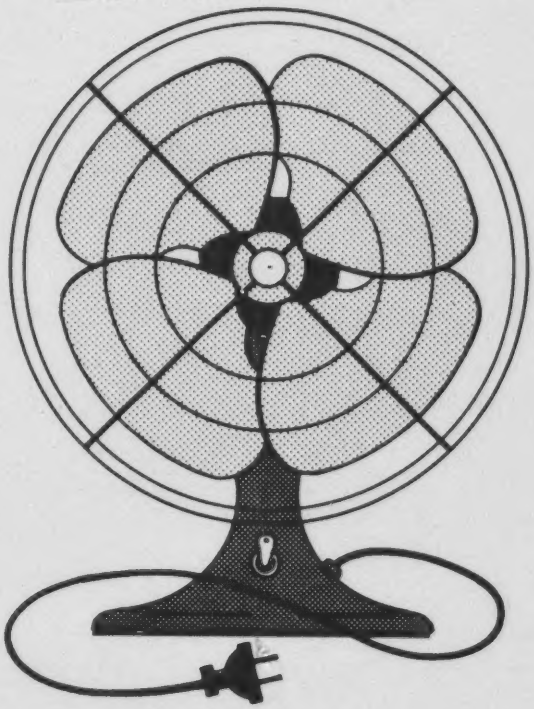
HEATING AND AIR CONDITIONING



The prevailing temperatures in today's classrooms are a product of our culture and not requirements of our bodies. Nor does lowering the temperature in winter or increasing it in the summer to current recommended energy-saving levels effect health, learning or achievement. Styles in clothing have had the greatest effect on temperature levels in school buildings over the past few decades. Minor adjustments in this area, as well as a number of others, will produce dramatic results in energy saving with no deteriorating effect on the educational process.

1. Issue an administrator's memo to all personnel discussing the efforts to conserve and telling them not to tamper with thermostats or other controls and not to open windows or outside doors.

2. Remove all unnnecessary heating and cooling equipment.

3. Establish the lowest thermostat setting that will not interfere with the maximum degree of learning. Set thermostats no higher than needed.

4. Avoid arbitrary thermostat settings recommended by other groups. Establish your own.

5. Check the efficiency and accuracy of controls regularly. Install new ones where necessary. The human body gives off 400 BTUs per hour and if heat controls are not working properly, the temperature in a room with 35 persons will go up eight to ten degrees in an hour.

6. Have heating and air conditioning systems balanced regularly so that hot and cold spots in buildings are reduced to a minimum.

7. Humidity control can be of importance in establishing a comfortable and productive environment. Maintain the proper balance between temperature and humidity.

8. Do not set thermostats higher than the recommended level in order to heat rooms faster. The rooms will not heat faster; they will just overheat.

9. Do not restrict air flow around thermostats.

10. Reduce night time, weekend, and holiday temperature settings to the lowest maximum efficient setting. Lower the temperature even further when school is closed for a number of days.

11. Install night, holiday, vacation, and weekend setback controls to reduce the temperature of the building and allow air handling equipment to operate without introduction of outdoor air.

12. Shut off or put on night setback all air-handling equipment at the time offices and school close. It is not necessary to operate equipment for stragglers as the building will maintain temperatures for a long period of time after controls have been shut off or reduced.

13. Reduce air handling units that are used for night school as soon as possible at the end of the regular school day and do not increase them until the time necessary to prepare the night school facilities for use.

14. Reduce to a minimum the heat in gymnasiums, locker rooms, and auditorium.

15. Encourage P.E. instructors to hold classes outdoors during warm weather to eliminate the use of air-handling units and lights in the gym. Shut off air-handling units and lights when classes are outside.

16. Set wall thermostats from a central control; disconnect classroom controls to prevent teachers, students, and custodians from changing the setting.

17. Allow sunlight into the building on cold days and keep it out on warm, humid days. Close drapes and blinds after school to reduce heat loss through window areas in the winter and to keep solar heat out in the summer.

18. Limit the number of entrances students and teachers use for arrival and departure.

19. Avoid blocking heating or cooling vents with furniture or draperies. Do not put anything on top of radiators. Keep all heating sources clear of furniture, draperies, bookcases, and files.

20. Survey location of each room thermostat in relation to doors, windows, and hot or cold sources. Relocate for maximum energy savings.

21. Be sure all windows fit tightly. Seal all openings around windows, doors, and other places where warm air could escape. Caulk old frames. Patch broken windows and damaged doors immediately. Double glaze windows, especially those on the north side.

22. Install storm windows.

23. Insulate attic and outside walls.

24. Check and repair insulation throughout the building, especially in attic spaces and on pipes, boilers, and tanks.

25. Do not cool below a prescribed temperature, and do not operate air conditioning equipment when a school is unoccupied.

26. Examine equipment to determine if several air conditioning systems can be combined to eliminate need to run and maintain several systems.

27. Train custodians and teachers in the proper use of controls.

28. Make sure custodians understand how to operate temperature settings on unit ventilators so they do not confuse the low-limit settings on these units with actual thermostat settings and overheat the room.

29. Shut off lights in air conditioned rooms when lights are not needed so as to reduce the heat load from lighting.

30. Reduce outside ventilation to the fewest changes per hour that state and local codes permit. Consider no more than one air change per hour.

31. Check outside air dampers and controls regularly to be sure they are functioning properly.

32. Regulate dampers on unit ventilators on buildings to reduce the amount of outside air brought in.

33. Do not take in fresh air during unoccupied hours. During occupancy, reduce circulation of inside air to a minimum.

34. Be sure exhaust fans operate no more frequently than required. Put them on timers. Reduce speed.

35. Vacuum clean tubes on all boilers at regular intervals to obtain maximum operating efficiency.

36. In multi-boiler systems, eliminate as many boilers as possible and still maintain heat.

37. Some air conditioning systems make electrical demands one and one-half times higher than others that are just as efficient. Choose wisely.

38. Keep tubes in condensors clean to maximize heat transfer.

39. Treat boiler water chemically to reduce scale.

40. Service air conditioners on a regular basis. Make sure maintenance men check and repair cooling towers; replenish refrigerant; examine fans, pumps, compressors, and other rotating equipment for poor seals, belt slippage, and other defects; check calibration of controls; and change filters.

41. Carry out a monthly combustion analysis to assure optimum efficiency.

42. Change or clean air filters on a regular basis.

43. Maintain fuel/air ratio specified by manufacturers to ensure maximum combustion and minimum soot production. The insulating effect of a one-eighth inch layer of soot can add 8 percent to a furnace's fuel comsumption.

44. Maintain proper burner alignment and condition. Determine the efficiency of each unit. Clean burner nozzles daily. Drain air tanks daily.

45. Provide for adequate combustion air in the boiler room.

46. Keep fuel oil at the recommended temperature at burner tip to ensure proper viscosity for complete combustion and to keep heat transfer surfaces soot free.

47. Keep fans, pumps, and compressors in the best possible operating condition.

48. Clean all combustion air blowers monthly or oftener.

49. Repair air compressor line leaks immediately.

50. Install economizer controls on air handling systems to restrict the intake of high temperature air during cooling season. Install outdoor damper controls to control the intake of outdoor air and humidity into air-handling systems based on the heat content of outdoor air.

51. Install electric reheat coils for data processing areas with controls to automatically come on when boilers are shut down.

52. Install independent gas or electric water heaters to allow complete shutdown of boilers in summer. Shutting off boilers eliminates heat created by steam mains in the building and takes a big load off air conditioners. If shutting off boilers is not practical, shut off all steam mains not required for water heating.

53. Replace hand valves on heating and air conditioning equipment with thermostatically controlled automatic valves.

54. Install indoor-outdoor reset control systems which will automatically raise and lower the temperature of heating system supply water to corresponding outdoor air temperatures.

55. Install mixed air controls for air-handling systems to maintain a constant mixed air temperature and a minimum damper position during the heating season.

56. Install controls on air compressors so one compressor carries the full load most of the time.

57. Install heat recovery systems to trap and reuse waste heat that otherwise might be exhausted into the atmosphere. Use reclaimed heat for hot water and reheat to eliminate need to operate additional equipment.

58. Run equipment used irregularly on an on-call or as-needed basis.

59. On electric heating systems, replace step controls with proportionate controls to furnish heat in exact accordance with need instead of in steps.

60. Consolidate summer school classes in adjacent rooms to reduce the number of air-handling units needed. Place classes around the perimeter of the building to take advantage of natural ventilation and natural light through windows.

61. Consolidate evening and summer school classes in areas so as to reduce the number of air-handling units operated.

62. School districts should encourage and cooperate in the design of more efficient heating and air-conditioning systems.

63. Shut off all exhaust fans between the close of school in the evening and opening the next morning.

64. Curtail use of resistance-type electric equipment, such as space heaters, coffee pots, and hot plates.

65. Operate ventilation fans in kitchens and home economics classrooms only when cooking equipment is being used.

66. Schedule all evening meetings, PTA, and others for a single building so that night setback temperatures can be retained in other buildings.

67. Do not heat unoccupied spaces.

68. Install automatic door-closing devises.

69. Do not operate air-handling units in rooms where the windows or doors are open.

70. Do not operate air conditioning at night.

71. Do not use extra boiler capacity to bring the temperature up to its recommended level quickly - it causes overheating and wastes fuel.

72. Do not allow the ventilating system to take in any outside air during the first half-hour of heating startup. Schools that have been empty for 12 hours or more are ventilated sufficiently by ordinary leakage.

73. Operate air conditioning equipment at the lowest head pressure and highest chill water or suction temperature possible so machines will not have to work so hard.

74. Close and cover baffles and vents on rooftop or window air conditioners during the heating season.

75. Reuse exhaust air from classrooms as pre-heated combustion air with one of several types of heat recovery devices.

76. Check the daily weather forecast before turning on air conditioning. If temperatures under 75 degrees are predicted, keep windows open and air conditioners off.

77. Do not use reheat unless absolutely needed.

78. Call in outside heating and air conditioning engineers or use qualified members of the maintenance staff to check the balance of air flow in all school buildings. Some rooms may be overheated, others chilly, because of incorrectly adjusted air vents.

79. Design mechanical systems so that they can take care of the specific task where the energy is needed. If one room, such as a meeting room, is the only one frequently used at night, design the heating and air conditioning units to take care of that room only.

80. Take advantage of breezes from large bodies of water as sources of natural ventilation.

81. Develop an information program to inform parents of proper clothing for children during reduced heating and cooling of classrooms.

82. Keep a supply of sweaters and jackets for use by students who do not react positively to lower temperatures.

83. Put additives in fuel tanks to minimize all foreign objects.

84. Clean external coils, fans, and motors of air conditioning units.

85. Replace all 110 volt air conditioning units with 220 volts.

BUILDING PROGRAMS

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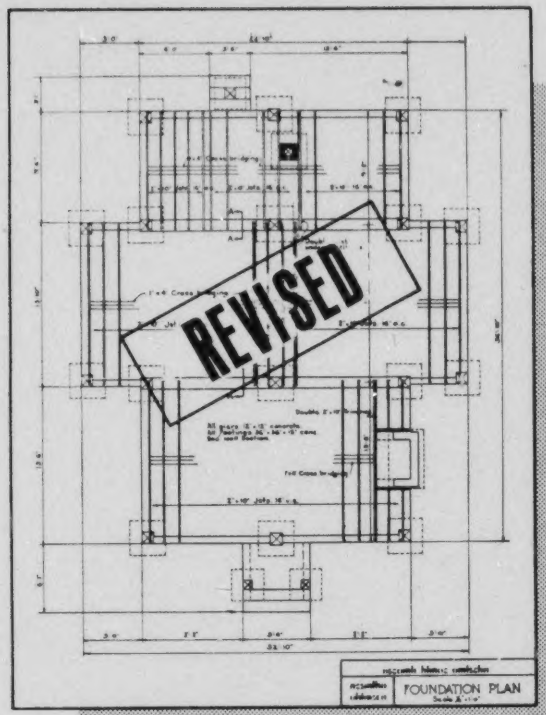

Much research is needed on the energy requirements of new and remodeled educational facilities. The energy requirements of schools being built today are considerably higher than schools built two or three decades ago. Cheaper lighting, more economical air conditioning, better insulation, and location of buildings to take advantage of the environment are just a few of the areas for study. Those responsible for the design of today's educational buildings must assume responsibility for conserving our already overtaxed energy producing facilities.

1. Utilize mechanical and electrical consulting engineers as part of the building planning team to ensure that energy systems correspond with the building for maximum efficiency. Energy requirements are affected by the solar and site orientation of the building. Unnecessary exposure and poor solar orientation of a building to the elements must be offset by an increased use of energy. During the cold season, the energy drain is further increased by heat loss due to wind exposure. Topography and landscape can offer shelter from the wind and filter excessive direct sunlight. Facilities built underground can benefit from the insulating qualities of the earth and reduce summer heat build-up and winter heat-loss.

2. Ventilation standards should be reexamined. Ventilation systems requiring the introduction of vast quantities of outside air with each air change might be obsolete. The tempering of outside air is extremely costly and the cost of the system to do this is high.

3. Determine if local and state exhaust and ventilation code requirements are realistic. Insist that they be changed if they are too restrictive and expensive.

4. Exhaust and ventilation requirements should not be exceeded.

5. Lighting levels for most educational functions have doubled since 1960 and tripled since 1950. It is recommended that a serious reexamination of these IES recommended standards take place.

6. Lighting accounts for up to 60 percent of the electricity used in school building. 80 percent of lighting energy is passed into the environment as uncontrolled heat. Counteracting this unwanted heat constitutes 40 percent of the air conditioning load. A new concept of lighting must be developed because the concept of lighting the so-called work plane evenly throughout a space is unrealistic. It would be more economical and energy saving to install flexible, task-directed lighting systems. Schools should ask for task-appropriate variances to avoid wasteful requirements.

7. Install systems that control the heat generated by lighting systems. Do this by capturing the heat before it enters space either by drawing return air across the fixture and back to the mechanical plant or using water-cooled fixtures.

8. Install systems that use waste heat from one building to heat another.

9. Install systems that use waste heat from a school building's mechanical system to heat incoming air.

10. Install extremely selective heating and cooling mechanical systems to ensure the heating system and cooling system do not function simultaneously.

11. Improve on the concept of heat storage.

12. Explore the concept of installing a total on-site generation of electrical energy to improve on the efficiency level of remote generating stations.

13. During the life of a school facility, operating and maintenance costs are three to four times the initial cost of the building. A bad "bargain" in terms of initial building costs can be an economical catostrophe for future operating budgets. Use computer programs to study each variable in the building development to check out the long-term economic consequence.

14. Mechanical equipment in schools should be kept within the technological capability of the people who operate and maintain the schools. Some schools are designed with equipment so sophisticated that operating personnel cannot handle it and, consequently, waste energy. Whole systems may never be used if they require correction of calibration beyond the capabilities of staff.

15. Recognize that operations and maintenance are two separate functions. Do not expect untrained, unskilled personnel to repair sophisticated equipment. Leave this for skilled technicians.

16. All systems and equipment must have manuals of instruction that not only tell proper operating functions, but warn of malfunction. This information should be readily available to all operators.

17. Replace worn out, inefficient, and obsolete equipment and systems.

18. All systems and equipment must be maintained at peak efficiency. If qualified specialists are not on the staff, districts should enter into contract maintenance agreements as soon as systems and equipment are installed. Establish a planned preventive maintenance program and make sure it is carried out.

19. Design schools so that air conditioning can be adjusted to function only when extreme heat is experienced.

20. Install mechanical systems so that they can take care of the specific task where the energy is needed. If one room, such as a meeting room, is the only one frequently used at night, design the heating and air conditioning units to take care of that room only.

21. Install switches in rooms so that lights near windows can be turned off when there is sufficient natural light in that area. Restructure switches in old buildings.

22. Install heat recovery systems to trap and reuse waste heat that otherwise might be exhausted into the atmosphere.

23. Insulate adequately.

24. Patch all cracks on walls, floors, and ceilings.

25. Use a minimum amount of glass.

26. Design the building to reduce duct work.

27. Use a 20-year life-cycle costing as the basis for purchasing heating, ventilating, and air conditioning systems for new or remodeled schools instead of low bid.

28. If water is heated by boilers that heat the plant, install individual gas or electric water heaters for summer use so boilers can be shut down completely.

29. Lower ceilings in older or poorly designed schools to decrease a room's air volume and create an air space that provides insulation.

30. Resolve the conflict between simplicity of equipment and controls and the conservation of energy.

31. Bring operations people up to the level of skill demanded by the equipment and controls.

32. Place windows on the north and south sides of a school to avoid the sun's direct rays.

33. Put in awnings, sun shades, or sun porches on the south side of buildings.

34. Install glazing on windows. Double glaze the windows facing north. The north side does not get much sun in winter but is subject to heavy winter winds.

35. Plant deciduous trees in front of windows. In summertime, full foilage blots out much of the sun's rays. In winter, when sun is desired, the leaves have disappeared.

36. Take advantage of breezes from large bodies of water as sources of natural ventilation.

37. Take into account the average temperature of an area or city before installing air conditioning. Do not install air conditioning for just a few hot days.

38. Some air conditioning systems make electrical demands one and one-half times higher than others that are just as efficient. Choose wisely.

39. School districts must encourage and cooperate in the design of more efficient heating and air conditioning systems.

40. Be sure windows fit tightly or make necessary repairs. Double glaze all replaced windows.

41. Add skylights and windows to buildings.

42. Design landscaping to minimize the amount of energy for upkeep.

43. Insulate ducts where they go through cold or hot spaces.

44. Insulate all hot and cold water pipes.

45. Install air-lock doors.

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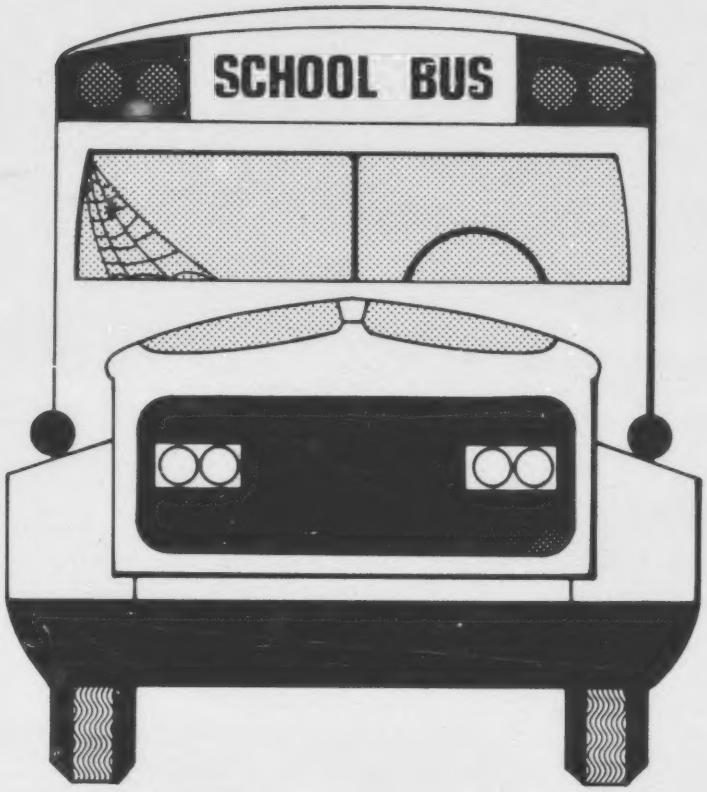
TRANSPORTATION OF PUPILS



Transportation of pupils involves getting students to and from school when they live outside the walking limits established by the district; on educational field trips; and to and from co- or extra curricular activities that supplement the regular educational program. Student commuting is also of major importance.

VEHICLE OPERATION

1. Tune and maintain engines to peak performance. Correct faulty spark plugs, points and carburetion.

2. Use modern analyzing equipment to ensure fuel and oil economy.

3. Keep gas tanks full to avoid excessive evaporation.

4. Ensure that bus tires are properly inflated. Soft tires increase gas consumption. Inflate to maximum safe level.

5. Reduce speed limit to as low as practical.

6. Reduce weight by removing luggage racks, extra tire, chains, etc.

7. Drive slowly and carefully the first few miles until vehicle warms up.

8. Avoid the "red line" even in shifting gears.

9. Reduce warm-up time for buses to the very minimum. Have drivers turn off their engines during loading and unloading of children or at any time engine is idling more than 2 minutes.

10. Avoid full throttle operation.

11. Avoid courtesy stops.

12. Schedule bus routes to avoid driving up hills; stay on main roads only.

13. Plan stops on level instead of on inclines.

14. Drive slowly back to the bus yard.

15. Use intercoms on buses to reduce stops for controlling discipline.

16. Install 2-way radios to direct operation or redirection of buses to avoid unnecessary use.

17. Monitor use of vehicles. Install trip recorders to record driver and vehicle operation. Use this information to reduce use of gas and oil.

18. Plan routes to make only right hand turns to save on idling time.

19. Consolidate loads.

20. Centralize pickup and return points.

21. Use computers to analyze bus loads and schedule bus runs.

22. Eliminate buses that use excessive amounts of gasoline.

23. Eliminate operation of all buses not truly needed.

24. Use smaller vehicles for long distance, light load runs. Use the smallest bus possible.

25. Bus students only during inclement weather.

26. Eliminate transportation for summer school.

27. Encourage high school students to walk to school or to form car pools.

28. Lengthen distances between pickup points.

29. Have older students walk to central pickup points.

30. Cooperate with nonpublic schools to consolidate bus routes.

31. Reduce field trips.

32. Use shuttle buses for students to and from athletic contests.

33. Minimize staggered school schedules.

34. Provide boarding for students who live in isolated areas a long distance from schools.

35. Use satellite bus parking stations at the extremities of districts to avoid "deadheading" back to a centralized bus garage.

36. If bus drivers have split shifts, determine if their last route ends near their home. If it does, have them take the bus home during the midday period. This will eliminate the extra driving that results from a driver bringing the bus back to the terminal, driving his car home, driving his car back to the terminal, etc.

37. When adding or replacing buses consider the smallest, most economical vehicle possible.

38. Change legislation which caused some buses to have capacity reduced.

39. Review and evaluate all security measures in the district. Make changes to take care of any increased problems resulting from the energy crisis.

DRIVER INSERVICE

1. Train new drivers on existing runs while bus is "deadheading."

2. Use simulators to reduce behind the wheel training in vehicles.

3. Increase frequency of driver inservice programs.

4. Reeducate bus drivers toward better fuel economy.

5. Retain experienced drivers as long as possible.

6. Train drivers to use pre-planned starts and stops for less gas consumption.

7. Hold joint workshops with maintenance and driver personnel to improve operation.

8. Use an incentive system for reducing vehicle fuel consumption.

CHANGES IN SCHOOL ORGANIZATION

1. Reestablish the neighborhood school where students can walk.

2. Establish a four-day school week, thereby saving one day's driving of buses.

3. Consolidate beginning and ending times of all schools including special education programs.

4. Relocate special education classes to neighborhood walking schools or centralized special classes in one location to avoid excessive transportation.

5. Review special programs to determine need for transportation. Determine if there are some special education students being bused that could walk.

6. Enter into interdistrict attendance agreements with other districts if excessive bus travel can be avoided.

7. Change attendance boundaries to reduce transportation.

8. Increase walking distances.

9. Contract with parents to provide transportation.

10. Reduce school year to minimum number of days to save operation costs.

11. Eliminate transportation for summer school.

12. Share equipment and bus runs with neighboring districts.

USE OF VEHICLES FOR TRIPS OTHER THAN TO AND FROM SCHOOL

1. Combine field trip requests from more than one school.

2. Limit field trips to full bus loads only.

3. Establish minimum and maximum distances for field trips.

4. Combine school teams and schedules so several games can be played at the same time. Consolidate bus trips.

5. Have districts share buses when holding athletic events.

ALTERNATE FORMS OF TRANSPORTATION

1. Use parent transportation and give assistance to parent in obtaining necessary insurance.
2. Use charter and public transportation.
3. Students should be encouraged to form car pools. Provide them with protected parking.
4. Encourage use of bicycles. Provide adequate and protected bike racks.
5. Have parents provide transportation instead of using after school activity buses.

MISCELLANEOUS

1. Keep community informed of fuel saving measures.
2. Use students and employees as resource persons for fuel saving ideas.
3. Encourage students and employees to use car pools.
4. Develop an information exchange of ideas on fuel conservation between districts.
5. Offer incentives for schools to originate new ideas of fuel conservation.
6. Unload buses at the most sheltered entrance to buildings.

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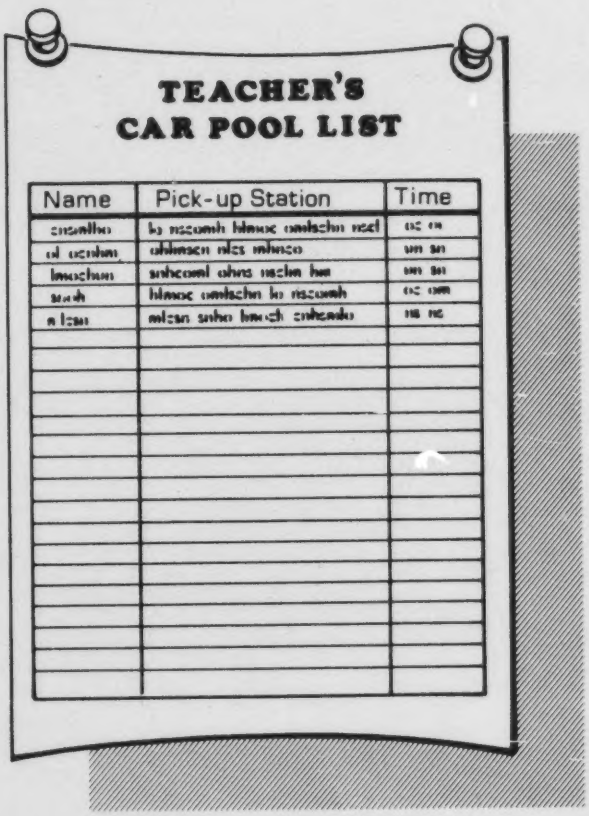
TRANSPORTATION OF STAFF



TEACHER'S CAR POOL LIST

Name	Pick-up Station	Time
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Employee commuting results in the largest consumption of fuel by school employees. Attendance at meetings and conferences, both inside the district and to other locales, is another fuel-consuming activity. A number of employees have responsibilities at various sites in a district and moving from area to area consumes fuel.

1. Encourage employees to bring their lunches rather than driving home or to a restaurant.

2. Work with city and county planners to speed up bicycle lanes and safe lanes. Provide adequate and safe parking areas for bicycles at schools and offices.

3. Develop innovations and creative programs to encourage staff to walk to school or ride bikes.

4. Provide assistance in developing car pools for teachers and clerical workers in schools.

5. Reeducate staff members toward better fuel economy.

6. Change to a four-day school week, thereby saving one day's driving.

7. Reduce school year to minimum number of days required by law.

8. Adopt policy for all trips by employees to meetings, conferences, conventions, etc. Limit amount of mileage allowed.

9. Use central place as point of embarkation for trips involving number of people.

10. Coordinate conferences out of district for sharing rides.

11. Use closed circuit television for meetings.

12. Utilize conference phones as substitutes for small meetings.

13. Use phone calls instead of home calls.

14. Reassign teachers and clerical workers closer to their homes.

15. Coordinate transportation with other county agencies.

16. District personnel who serve a number of schools should plan on coordinate trips to include as many stops as possible and include other district personnel serving the same schools.

17. Educate all workers, before they embark on a trip, to ask themselves: Can someone else who is going there do it? Can I deliver or do something for someone when I go on a trip?

18. Let school staff members ride school buses whenever feasible.

19. Pick an area for staff meetings that requires the least amount of driving for all concerned. Insist on car pools.

20. Establish policy on distance to walk to meetings.

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ADMINISTRATION OFFICES AND PLANT

Administrators, secretaries, bookkeepers, and other support personnel occupy an appreciable amount of space in the modern school complex and their functions have a marked effect on the energy consumption of the district. Effort by these personnel in their areas of work can reduce energy consumption.

1. Delete electrical equipment where possible in favor of manual operation -- typewriters, duplicating machines, calculators, etc.

2. Have directional lighting in lieu of overhead lighting.

3. Reduce corridor and parking lot lighting.

4. Reduce night lighting of buildings.

5. Reduce or eliminate the number of coffee pots within offices.

6. Rearrange office hours to make maximum usage of daylight hours and warm days.

7. Change to a reduced work week.

8. Add more switches for better control of lights.

9. Install rheostats for dimming purposes.

10. Reduce size of room to commensurate with the number of people to be accommodated.

11. Share rides with other personnel.

12. Reduce the number of meetings of personnel.

13. Radio equip district vehicles for better utilization.

14. Utilize smaller cars for travel.

15. Better organize work crews to reduce travel.

16. Use centralized meeting places.

17. Reduce the number of deliveries of supplies and mail to schools.

18. Utilize full days for meetings rather than a series of shorter meetings.

19. Combine meetings to allow personnel to travel together.

20. Allow employees to ride school buses.

21. Allow employees to transfer to work areas closest to their homes.

22. Hold board meetings and PTA meetings during daylight hours.

23. Cut back custodial services to every other day.

24. Eliminate use of buildings for teacher preparation before and after teaching hours.

25. Unify school district to provide better use of facilities, equipment, and energy saving operations.

26. Use school buses for transporting teachers to meetings.

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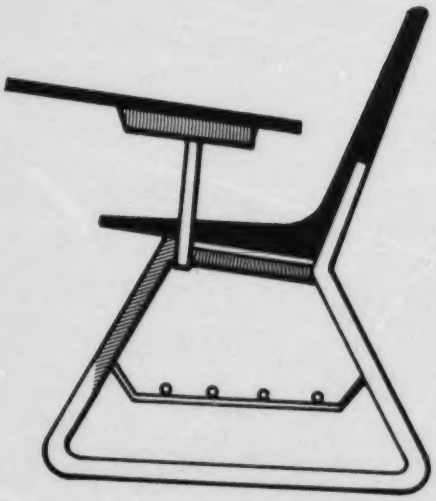
REGULAR CLASSROOMS



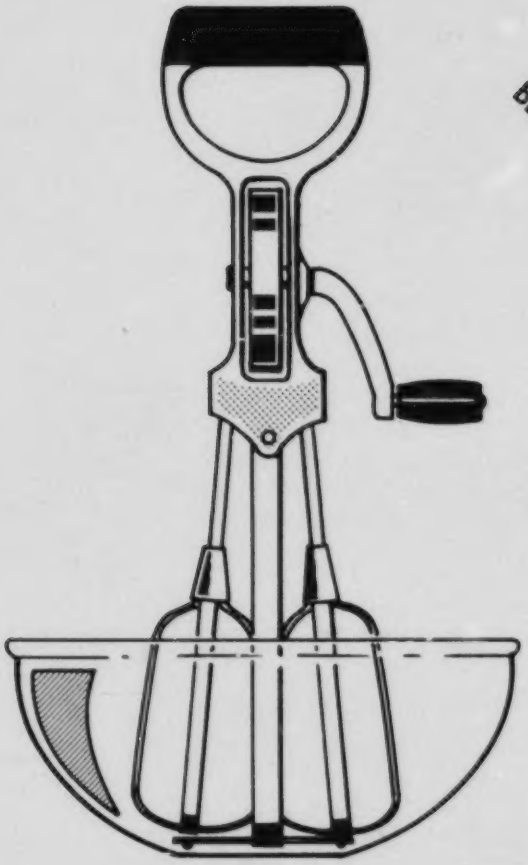
A differentiation is made in this report between Regular Classrooms and Specialized Classrooms. Energy-saving ideas in Regular Classrooms is confined to teaching activities in reading, mathematics, social studies, history, language arts, and other areas where special room designs or highly specialized equipment is not generally found.

1. Install skylights to provide light and solar heat.
2. Lower ceilings, where possible, to reduce air space for heating.
3. Reduce school week to four days.
4. Change incandescent bulbs to florescent lighting.
5. Gradually lengthen the school day to take advantage of daylight and reduce the number of days for the year.
6. Change vacations to allow more time for school during fair weather.
7. Paint classrooms in colors more conducive to reflecting light.
8. Hold classes out of doors if weather permits.
9. Turn down thermostat to a reasonable cool setting. Reduce heat as temperature varies.
10. Encourage more efficient use of AV equipment through large group viewing.
11. Provide large group instruction through team teaching, aides, etc.
12. Use elementary schools in attendance areas of high school students for alternative site programs or classes.
13. Remove catches that keep doors open.
14. Provide better insulation for rooms.
15. Add drapes and use them to regulate cold or heat.
16. Reduce lighting. Find out how much light is needed for optimum reading or desk work. Do not exceed this.
17. Use dimmer switches and/or controlled lighting.
18. Make thermostats "kid-proof".
19. Encourage students to wear warmer clothes as room temperature is lowered.
20. Place awareness signs encouraging students to conserve energy.
21. Conduct intermittant instruction on need for energy conservation.
22. Schedule adult education programs to meet in rooms which receive full use during day to utilize the existing room heat.
23. Include adults in regular high school classes if class size permits.
24. Generate heat through exercise period in classroom.

25. Provide desk light for teacher to use during preparation period so that classroom lights can be turned off when students leave.

26. Make the maximum use of classrooms. Have teachers do out-of-class work in central office areas and darken classrooms if not needed.

SPECIALIZED CLASSROOMS



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The category of Specialized Classrooms for energy conserving ideas refers to activities in home-making, driver training and education, special education, shops, drama, speech, art, music, business education, adult education, physical education, and other related activities.

1. Decrease the amount of hot food prepared.
2. Limit pre-heating of ovens to the very minimum. In some cases, pre-heating is not necessary.
3. Use microwave ovens whenever feasible.
4. Redesign curriculum to have students take more classes at home or do part of cooking as a home activity.
5. Utilize the food prepared by students for student or faculty meals.
6. Reduce the size of freezers to minimize on-site storage of frozen foods.
7. Use manual defrosting rather than automatic defrost equipment.
8. Do dishwashing by hand with small amount of dishes. Operate dishwasher only with full loads.
9. Fill washers and dryers to capacity and promote the use of clotheslines.
10. Use small appliances in place of large ranges whenever economical.
11. Use cold-water washing when possible.
12. Repair all equipment immediately and establish routine maintenance schedules.
13. Cook by time and temperature for best results. Use minute timer for precise cooking operations.
14. Don't open oven doors more than necessary to check on foods being prepared.
15. Keep pots and pans covered while cooking whenever possible.
16. Make sure burners are completely off when not in use.
17. Use a stopper in sink when washing dishes by hand to avoid running hot water continuously.
18. When washing clothes, use the correct cycle.
19. Don't overload dryers. Avoid overdrying clothes.
20. Clean lint screen in dryer regularly.
21. Do not allow leaky hot water faucets.
22. Lower temperatures in water heaters on weekends; turn off during vacations.

23. Design menus that use the least amount of energy for cooking or baking.

24. Turn off equipment when not in use.

25. Match pan size to burner unit size.

26. Refrigerator and freezer should be kept more than half full. Items absorb and help hold cold.

27. Preheat the oven only for items requiring precise oven temperatures at the start of cooking.

28. Use high heat only to bring water to a boil or to start cooking food with water. Then reduce heat level to lowest possible point.

29. Use small amounts of water whenever possible; they heat faster.

30. Have all ovens calibrated.

31. Locate and repair any water or steam leaks.

32. Keep refrigerator and freezer coils clean; replace door seal when it no longer seals tightly.

33. Lower water temperatures as low as practical - not to exceed 140 degrees.

34. Don't turn equipment on too far in advance of its use. Do not preheat oven for a longer time than is exactly necessary.

35. Consolidate baking activities into one day of continuous use.

36. Do not use garbage disposals.

37. Put window in all oven doors to avoid opening to check status of food.

38. Use hood fans only when necessary.

39. Do not use freezers more than is economical.

40. Turn off pilot lights.

41. Install equipment and use cooking procedures that use the least amount of energy.

42. Change to a four-day school week.

43. Eliminate the use of electric can openers.

DRIVER TRAINING

1. Reduce total mileage driven, reduce behind the wheel time, and reduce the amount of freeway driving time.

2. Use smaller cars with lower horsepower.

3. Use older model cars with four or six cylinders, stick shifts, and less power equipment.

4. Vehicles should be equipped with steel belted radial tires with more air pressure in tires to reduce gasoline consumption.

5. Pretest students and give credit for previous training and experience. Reduce hours based on results of pretest.

6. Reduce the number of oil changes.

7. Reduce maximum speed to most efficient operating speed for engine involved.

8. Increase use of simulators to reduce behind the wheel training.

9. Restrict driver training use of vehicle to as limited a geographic area as possible.

10. Operate driver training vehicle with full passenger load.

11. Keep vehicles tuned to peak performance.

SPECIAL EDUCATION

1. Increase the number of home classes.

2. Consolidate transportation routes of special education children to avoid duplicating bus routes.

3. Develop more flexible starting times to utilize regular bus schedule.

4. Integrate State of California master plan earlier than now planned.

5. Have special education classes meet with regular classes in same room or while regular class is out to recess.

6. Integrate more individual students or groups into regular classes.

7. Use one large classroom divided into several smaller rooms.

SHOPS

1. Reduce lighting to levels actually needed in work or training areas.

2. Use more hand tools, teach more hand skills, assign more students per power work station.

3. Convert to 440 volt equipment if it will reduce use of electricity.

4. Coordinate shop use and classroom use for more efficient utilization of space in shop area.

5. Reduce the acreage in student farms.

6. Restrict use of doors in shops.

7. Reduce the number of forges, kilns and smelters.

8. More useful projects in shops to help other departments in the school with equipment, repairs, etc.

9. Reduce class size.

DRAMA

1. Design activities for a more efficient use of multi-purpose rooms.

2. Reduce lighting, especially stage wattage, through the use of dimmer switches.

3. Limit the number of public performances.

4. Use only essential amplifying equipment.

5. Use less and lower lighting during rehearsal.

6. Schedule more outdoor performances.

7. Use regular classroom more when small groups are practicing or performing.

ARTS AND CRAFTS

1. Reduce hours of kiln use.

2. Develop block scheduling of class time.

3. Organize more hand operations, especially in crafts.

4. Conduct outdoor classes, especially painting and drawing.

MUSIC

1. Reduce concerts, both on-site and outside performances.

2. Walk or march to some events.

3. Better utilization of rooms, not using large spaces for small class or individual instruction.

4. Block scheduling of class time.

BUSINESS EDUCATION

1. Restrict the use of electric typewriters and other electric machines.
2. To cut down on the use of power equipment, use more hand operated equipment, such as ditto and mimeograph.
3. Install integrated circuits in business machines.
4. Utilize more community and business facilities for training.
5. Use both sides of all paper products.
6. Use P.A. system, blackboards, overhead projector, etc., instead of mimeo or ditto, when there is the need to cut back on use of paper supplies.

ADULT EDUCATION

1. Centralize adult education classes in one area to reduce the use of heating, air conditioning and electricity.
2. Schedule adult classes to meet during the day.
3. Regulate evening use of schools for adult education to the minimum, scheduling classes on the same nights and at the same times as much as possible.
4. Do a census on location of adult class participants and schedule classes to the nearest locations.

PHYSICAL EDUCATION AND SPORTS

1. Restrict the use of showers to the very minimum.
2. Reduce the capacity of shower heads to cut down on the amount of hot water used.
3. Reduce water temperature in showers.
4. Put time controls on shower valves to strictly regulate their use.
5. Put master shut off on shower valves.
6. Lower swimming pool temperatures.
7. Minimize filter pumping hours on pools.
8. Use solar heat for heating pools.
9. Do not heat pools during warm or hot seasons of the year.
10. Put plastic covers over pools when not in use. Enclose pools if possible.

11. Keep gym temperature at 65 degrees or below.

12. Implement block scheduling of class time two days a week.

13. Utilize commercial laundering of towels.

14. Have students bring their own towels.

15. Limit the geographical area of athletic competitions to reduce traveling by bus or car.

16. Expand inter-mural competition to substitute for intra-mural.

17. Conduct basketball, volleyball, and other game practice sessions outside as much as possible and during daylight hours.

18. Combine girls and boys sports as much as possible to reduce the number of hours facilities are used.

19. Concentrate swimming as much as possible to shorten the number of hours pool is used.

20. Shut off air-handling units and lights in gyms when physical education classes are being held outside during warm weather.

21. Do not use electric scoreboards.

LABORATORIES

1. Do not turn on equipment or burners before they are needed.

2. Increase the number of students that share equipment and burners.

3. Do not purchase materials that must be kept cold or frozen until they are actually needed.

4. Make sure that refrigerators and freezers are in good repair and door seals are tight.

5. Wash equipment with cold water whenever possible.

6. Do not let water run unnecessarily.

7. Turn off bunsen burners when not in use.

8. Repair leaky faucets.

9. Keep water temperatures at the lowest possible practical temperature.

10. Do not use garbage disposals.

11. Use ventilating fans only when necessary.

12. Turn off pilot lights.

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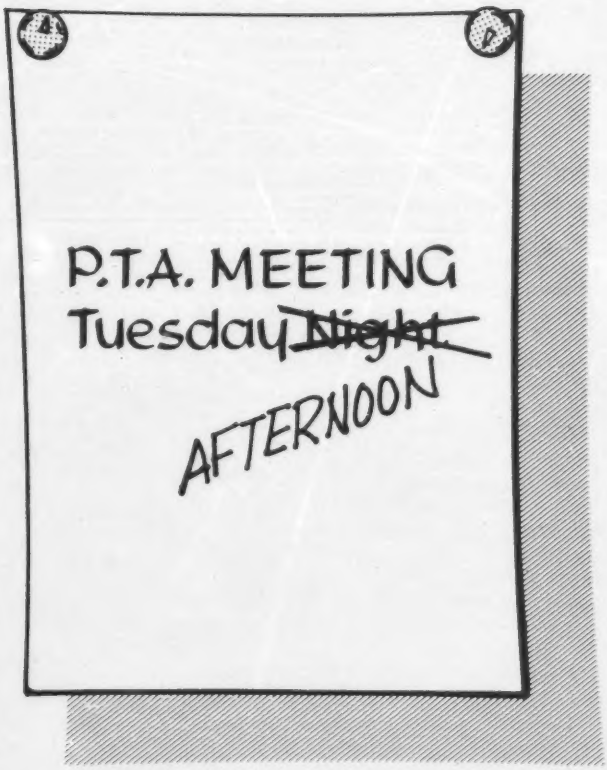
CLASSROOM USE OUTSIDE THE REGULAR DAY



Public schools are the property of the communities that build them. They object to having them unused two-thirds of the day. Consequently, community use of classrooms, gymnasiums, swimming pools, tennis courts, playing fields, etc., in the evening, weekends, and during vacations is a regular procedure. This additional use results in added energy consumption.

1. Reduce use of facilities for non-school purposes.

2. Schedule evening meetings for a single building so that night setback temperatures can be retained in the other buildings.

3. Insist that groups using facilities outside the regular school hours keep their meetings to the shortest time possible.

4. Provide facilities that are the proper size that the group needs. Do not assign rooms or buildings that are too large.

5. Put strict controls and shorter hours on the use of lighted facilities, i.e. tennis courts, pools, fields.

6. Schedule meetings in facilities that are available during the day. Utilize facilities away from the school whenever possible.

7. Schedule activities to a period when minimal heat, light, and air conditioning are needed.

8. Schedule outside activities to areas where public transportation can be used to minimize individual driving.

9. Assist participants in car pool planning.

10. Put charges or establish fees that discourage use of facilities.

11. Schedule all activities back-to-back while building temperature is adequate.

12. Restrict activities to the use of one wing, building, or campus.

13. Issue instruction sheet or check list with use permit which delineates the responsibility for usage. Possible non-return of fee for non-conpliance with rules.

14. Restrict use of high-wattage equipment.

15. Train users in use of facilities.

16. Install a separate meter for each activity.

17. Leave only minimum restrooms open after hours.

18. Install pay phones on campus to avoid leaving offices open unnecessarily.

19. Eliminate extra services like snack bars. Use catering trucks, vending machines. Suggest brownbags and thermos.

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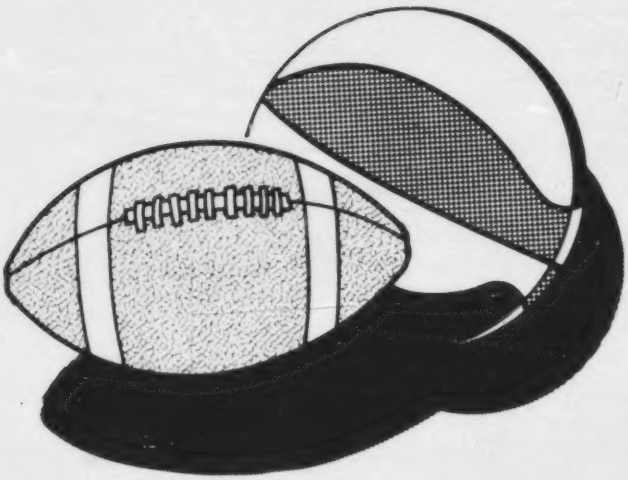
EXTRA CURRICULAR ACTIVITIES



Extra and co-curricular activities are an important part of the modern educational program. These activities extend and supplement the regular curricular program. Because these activities often require students to travel distances or require specialized equipment or facilities, they have a major impact on the amount of energy consumed by a district.

1. Evaluate practices of the district which allows the need to leave the district or county to find educational experiences to meet needs of students and the objectives of the educational program.

2. Reexamine the current kinds of educational activities, K-14, designed to develop skills and understanding in the use of leisure time. Then select and introduce those activities which are geared to the local area rather than requiring travel. "Staying at home" may just as well meet the schools' educational objectives as "going away".

3. Develop programs that will involve more students as participants rather than spectators in co-curricular and intra-mural programs at the local community level.

4. Schedule all events in available educational facilities most appropriate for the events. Consider size of audience, size of room, the acoustics, type of seating, type of room, etc.

5. Develop interdistrict agreements to help reduce additional transportation generated by after school bus runs.

6. When providing transportation for co- and extra curricular groups, make provisions for maximum vehicle use.

7. When it is definitely established that a given number of parents of participants are to attend a game, use parent vehicles to help transport players.

8. Limit the number of contests in each sport.

9. Use coaches as drivers of mini-capacity vehicles for small groups.

10. Coordinate the transportation of participants of one or more schools in the same or neighboring districts that are going to the same meeting or activity.

11. Establish a mileage allowance for each activity.

12. Eliminate graduation ceremonies.

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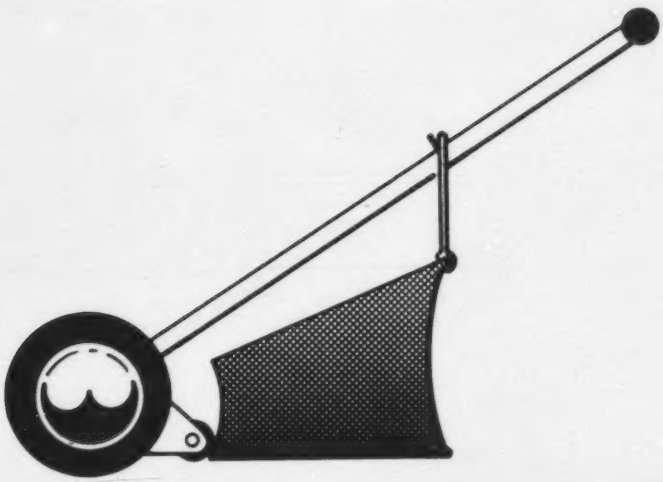
MAINTENANCE OPERATIONS AND GROUNDS



School districts have custodians to keep rooms and offices clean and tidy, maintenance "crews" to repair and maintain buildings and equipment, and groundsmen to mow and garden. The amount of energy used by a school district is affected markedly by their skill, training, and diligence.

1. Have utility companies make presentations to staff to aquaint them fully with problems and solutions.

2. Give high priority to all maintenance plans and programs that result in energy conservation.

3. Organize groundsmen and maintenance personnel assignments to minimize use of trucks.

4. Monitor use of all vehicles used in maintenance and operations.

5. Ration gas for all equipment. Make it stretch.

6. Cut grass and edge less often.

7. Keep all gas burning engines tuned to peak performance.

8. Consolidate and increase size of schools, reducing the number of plants. Use double sessions.

9. Adjust temperature in buildings where custodians work to the lowest possible comfortable temperature for physical labor.

10. Make warehouse deliveries and messenger service to schools on a very minimal basis.

11. Reschedule room cleaning to daytime as much as possible to save electricity used at night.

12. Lock gas tanks on all vehicles to avoid theft.

13. Control purchasing of equipment to obtain the correct size.

14. Purchase electric motors of the proper horsepower and proper voltage. Running motors that are under full capacity can lead to as much as a 25 percent power waste.

15. Replace worn-out equipment with small battery-operated vehicles.

16. Train all maintenance and operations personnel in the proper use of controls.

17. Arrange for maintenance contracting in highly specialized areas that includes checking of equipment, conducting preventive maintenance tests, making adjustments, and responding to emergencies. All systems and equipment must be maintained at peak efficiency.

18. Establish an inservice training program for custodial and maintenance staffs featuring experts in the field of thermostatic control and lighting as well as manufacturing representatives who can give instruction in operating pieces of equipment at maximum efficiency. Bring operations people up to the level of skill demanded by the equipment and controls.

19. Do not buy inexpensive and inferior equipment to save money on the initial cost if you know it will use more fuel or electricity to operate it.

20. Establish a planned preventive maintenance program for all equipment and make sure it is carried out.

21. Get your building engineers fully involved at reducing use of utilities. Show them each monthly bill and graph results so they can see the progress being made. They can do more than anyone else to reduce utility useage once they see their efforts are really paying off.

22. Encourage employees to bring their lunches rather than driving home or to a restaurant.

23. Recognize that operations and maintenance are two separate functions. Do not expect untrained, unskilled custodians to repair sophisticated equipment. Leave this for skilled personnel.

24. Train custodians to be "low-echelon" maintenance men, capable of recognizing when something needs adjustment or repair and to know the proper person to call immediately.

25. Redesign, remodel, or replace worn out, inefficient, or obsolete equipment and systems.

26. Hold joint workshops with maintenance and bus driver personnel to improve operation of vehicles.

27. Equip maintenance trucks with all necessary tools.

28. Cut back custodial services to every other day.

29. Install trash compactors to reduce use of garbage hauling trucks.

30. Use cold water to clean when possible. Select cleaning supplies and equipment for effective use with cold water.

31. Use the minimum amount of water for sprinkling and irregation.

FOOD SERVICES

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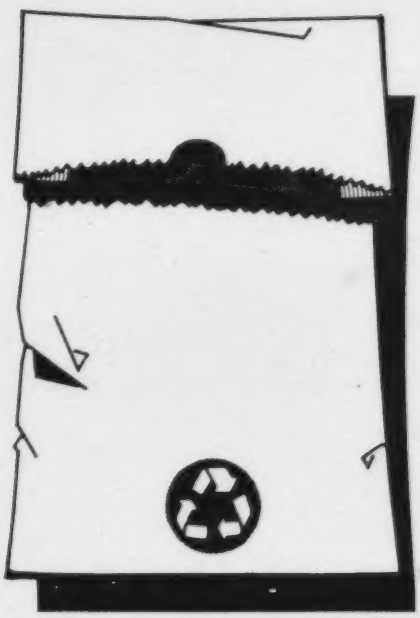

Providing breakfast, lunch, and snacks mid-morning and mid-afternoon is a function of most school districts in the United States. The Federal government and State governments endorse, encourage, and subsidize feeding programs. Schools contain specially designed cooking and eating areas. Energy consumption is significant.

1. Design menus that use the least amount of energy for cooking or baking.

2. Centralize food preparation.

3. Turn off equipment when not in use.

4. Use prepared foods as much as possible.

5. Arrange menus to occasionally serve cold lunches.

6. Coordinate food preparation with adjoining districts and other public agencies in the district.

7. Match pan size to burner unit size when cooking.

8. Refrigerator and freezer should be kept as full as possible. Items absorb and help hold cold.

9. Preheat the oven only for items requiring precise oven temperatures at the start of cooking. Do not preheat for a longer time than is exactly necessary.

10. Thawed or partially thawed foods will cook faster than those that are frozen.

11. Cook by time and temperature for best results. Use a minute timer for precise cooking operations.

12. Use high heat only to bring water to a boil or to start cooking food with water. Then reduce level to lowest possible point.

13. Do not use the oven to heat food services or kitchen area, but when finished cooking, leave the oven door open in order to utilize leftover heat if needed.

14. Use the smallest amount of water possible; it heats faster.

15. Have all ovens calibrated to ensure accuracy.

16. Locate and repair any water or steam leaks.

17. Keep refrigerator and freezer coils clean; replace door seals when they no longer seal tightly.

18. Lower water heater temperatures as low as practical, not to exceed 140 degrees.

19. Do not turn equipment on in advance of its use unless absolutely necessary.

20. Hand wash instead of using the dishwasher with small amounts.

21. Do not use garbage disposals.

22. Put window in all oven doors to avoid opening to check status of food.

23. Use hood fans only when necessary.

24. Reduce as far as practical all outside serving lines to eliminate letting in cold air.

25. Do not use freezers more than is economical.

26. Reduce use of school cafeteria as much as possible. Encourage students to bring their lunches.

27. Eliminate all unnecessary meetings that require the use of food facilities.

28. Check food delivery routes to see if they can be designed more efficiently.

29. Turn off pilot lights if a safety factor is not involved.

30. Eliminate coke machines.

31. Install equipment and use cooking procedures that use the least amount of energy.

32. Change to a four-day school week.

33. Cook and bake ahead as much as possible.

34. Use oven to capacity.

35. Eliminate unnecessary use of cafeteria by outside people.

36. Open campus so students can walk home or use restaurants.

37. Eliminate or reduce breakfast and nutrition periods.

38. Eliminate the use of electric can openers.

39. Check to see if heating of kitchen area can be delayed by the regular school heating plant and utilize the cooking heat.

40. Lower water temperatures in water heaters on weekends. Turn off for vacations.

41. Use cold water when possible for washing.

42. Use small appliances when possible instead of large ranges.

43. Use manual rather than automatic defrosting.

44. Make sure ovens are sealed properly.

45. When purchasing new equipment, make sure it is the proper size and wattage.

46. Remodel, redesign or replace worn out, obsolete, or inefficient equipment.

47. Use microwave ovens.

48. Repair all equipment immediately and establish routine maintenance schedules.

49. Keep pots and pans covered while cooking.

50. Use pressure cookers to reduce cooking time.

51. Use stopper in sink when washing dishes by hand to avoid running hot water continuously.

52. Do not allow leaky water faucets.

53. Use disposable service to eliminate washing.

EMERGENCY PROCEDURES

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Absence of heating fuel or electricity, temporary blackouts, or equipment failures can seriously damage school property. Plans for such emergencies must be developed. Everyone must be aware of what to do and what precautions to take.

1. Have emergency plan ready and clearly understood by all.
2. Check manuals and contact experts before shutting down complicated equipment.
3. Attempt to maintain sufficient heat to keep pipes and fire protection equipment from freezing.
4. Drain as many pipes as possible.
5. Pour anti-freeze into toilet bowls, sink traps, and fire protection equipment.
6. Do not heat spaces where freezing temperatures can be safely maintained.
7. Shut off all exhaust fans.
8. Close all outside air dampers.
9. Board up exterior doorways and windows on building sides that get cold winds.
10. Caulk around outside doors and windows.
11. Use temporary heating units in areas where freezing would do severe damage.
12. Make periodic inspections.
13. Ensure that state legislatures have adequate laws for emergency purposes.

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PROBLEMS IN ENERGY CONSERVATION

Seven hypothetical problems which could confront public schools should the energy crunch worsen were posed to seven groups composed of school personnel from all areas of the educational fraternity -- custodians to superintendents. Each problem-solving group was given a problem to solve. The groups were asked to describe the processes they would use to find a solution to the problem; what modifications would they make in their programs to affect an educational program as close to normal as possible; and how would they implement their plan.

Although it is recognized that the specific problems, as set forth, might never occur, the processes, modifications, and implementation plans can be applied to many similar situations.

REDUCTION IN ELECTRICAL POWER

You are chief school administrator of a unified school district of 20,000 students -- 3 high schools, 6 intermediate schools and 16 elementary schools. The district is 18 miles long and 9 miles wide. Sixty percent of the students ride buses. All schools are heated by natural gas. Seventy percent of your schools are less than 15 years old, air conditioned, with a minimum of exterior lighting. You have just been notified that the district's electrical supply will be reduced by 30 percent effective in 30 days.

Procedures:

1. Conduct a survey of electrical consumption using key personnel to determine areas of essential use and areas where savings can be effected.

2. Contact the electric company to determine light level requirements and energy consumption requirements in each situation. Utilize an experimental classroom to observe alternative effects.

3. Determine base consumption data giving special attention to heating and refrigeration as these are the largest consumers of electric power.

4. Develop an electrical conservation plan.

5. Make all concerned persons aware of the situation and enlist their cooperation by providing a thorough orientation.

6. Involve students and the curriculum for information dissemination and for obtaining solutions.

7. Establish priority cuts and alternatives, and identify the consequent effects of each.

8. Provide a method for "feedback" data on the results.

9. Consider safety and health factors when reducing lighting.

Modifications and Implementation:

1. Turn off air conditioner -- only qualified, experienced people should handle changes in air conditioning equipment.

2. Paint walls and ceilings and change floor coverings to improve illumination.

3. Replace incandescent lights with fluorescent lights wherever possible.

4. Evaluate after hours use of facilities. Reduce these uses where possible.

5. Examine possibility of a shortened school day.

6. Post signs in all locations to remind people where savings can be made. Incandescent lights should be turned off at all times when not in use -- fluorescent lights should be turned off when they will not be used for an established period of time.

7. Provide method to communicate results of modifications to all concerned persons.

8. Adjust time clocks to turn off night lights at a specified time. For outside lighting use lower wattage and cut alternate lights.

9. Eliminate summer school.

10. Hold classes out of doors whenever possible.

11. Use electric booster water pumps fewer hours. Reduce the amount of hours swimming pool circulation pumps are on.

12. Lower temperature or discontinue heating swimming pool.

13. Ban the use of electric coffee pots. Don't expect to gain much savings in electricity by not using electrical appliances and electric typewriters.

14. Eliminate nighttime athletic events.

15. All electric equipment has its use rate listed on it. Examine it for base line data.

16. Serve cold lunches.

17. Create awareness and find solutions to energy conservation by incorporating information and problems into the curriculum.

18. Turn off every other fluorescent fixture.

19. Limit the number of hours duplicating equipment runs.

20. Reduce the time T.V. sets are on.

21. Double-up classrooms for a portion of each school day whenever possible.

BLACKOUTS

You are the chief school administrator of a unified school district of 20,000 students -- 3 high schools, 6 intermediate schools and 16 elementary schools. The district is 18 miles long and 9 miles wide. You have just been notified that your district has been divided into four areas -- Area A, Area B, Area C, and Area D. You have approximately the same number of schools in each area. Sixty percent of your students ride buses. Seventy percent of your schools are less than 15 years old, air conditioned, with a minimum of exterior lighting. Effective in 30 days, each area will experience a one-hour period of time when electrical power will be shut off.

Area A	-	9:00	-	10:00
Area B	-	10:00	-	11:00
Area C	-	1:00	-	2:00
Area D	-	2:00	-	3:00

Modifications and Implementation:

A. **Overall Operation Considerations**

1. Each school facility such as district office, separate facility, or individual school should see that particular essential emergency services and facilities will be in operation during blackout; emergency phone, electrically powered locking and unlocking devices, battery-operated lighting in areas requiring same, vaults, etc.

2. Informational and planning sessions should be programmed for all school personnel - - students, staff, and administration - to include background, rationale, and detailed planning as far as feasible.

3. School staff needs to be oriented to accept challenge to seek out alternative methods of accomplishing tasks in their own particular area, to discuss plans with person to whom they are responsible, and implement same. Principals and district office personnel should compile lists of these methods and share with other personnel.

4. Pre-planning of activities prior to blackout hour is necessary in those instances where a sudden stoppage causes problems of recouping position such as data processing equipment, electronic equipment, etc. to avoid costly post-blackout involvement.

5. Alternate schedules and activities need to be planned for classes and groups that depend entirely upon power for lights such as interior rooms, offices, etc.

6. Blackouts, other than the advance notice rolling blackouts, need the same amount of pre-planning. In most instances, especially if the blackout is of short duration, the alternative plans are applicable for both.

7. A positive approach to energy saving and blackouts must be discussed with all school personnel, including students. Pre-planned orientation, publicity, and effective action plans can assure a minimal effect of blackout upon school operations, attendance, and accomplishing the school's objectives. All must know WHY and WHAT's COMING and participate in planning. All communications must tell the same story and often.

8. Security and safety provisions in all areas where problems may arise by blackout and post-blackout should be a consideration in planning restrooms, school storage areas, vaults, etc.

9. All facilities should be studied for measures to conserve heat during blackout -- partially closing drapes, draft control, fewer classroom interruptions by office messengers, etc.

10. Specific directions should be provided and prominently posted regarding what is to be done and not be done by all personnel concerning electrical equipment during and after the blackout. Locks and tamperproof guards should be established on thermostats, heater cabinets, etc.

11. A pre- and post-blackout authority needs to be established, and the paramenters of that authorization communicated to all personnel. Responsibilities and authority must be clearly defined. Safety and return-to-normal operation checks should be planned prior to and implemented immediately after blackout.

12. At all times, immediately prior to, during, and after blackout, there should be one person in each operation who has the authority and is available to all.

B. Elementary School K-6

1. Teachers would shift emphasis on activities. Emphasis would be on P.E., Vocal Music, Arts, Crafts, and listening activities.

2. Pre-planning would focus on "what can we do that does not require electricity?"

3. Pre-prepared visual aids would expedite instructional process for classes remaining indoors; one dimension media used.

4. Related activities outside of classroom could be pre-planned. Coordination between various groups would be done through the Principal's office.

5. Students and staff should be notified that there will be no electricity and the effect it will have upon choice of dress for that hour or day.

6. General conclusion is that K-6 could adequately plan alternate instructional program for blackouts with minimal effect on objectives.

C. High School Programs . . . . Outside of Classroom

1. Feeding students - With advance notice, students will be requested to bring lunches. Cafeteria can schedule menus of non-heated foods such as sandwiches, salads, etc. Period schedule may be changed to have lunch earlier or later than the hour of blackout. If later, a "snack break" can be scheduled to "tide them over until lunch".

2. Athletic events, school plays, and music events could be rescheduled to other times. Intramurals could be moved to outdoor facilities, giving consideration to weather and dress.

3. Assignments of personnel should be adjusted to provide adequate campus control.

4. Schools with swimming pools should have available pool covers and pools should be covered to maintain heat during hours when electricity is off.

5. If blackout hours are at the beginning or end of the day, school schedule can be moved up or back or minimum day program can be put into effect.

6. Advance plans need to be made and scheduled to reset and adjust mechanical equipment after power stoppage -- bells, clocks, heaters, etc.

7. Maximum use of outdoor and large group instructional facilities need to be planned.

8. P.E. classes should be held outdoors.

9. Schools adjacent to parks should schedule use of those facilities to expand their out-of-classroom capabilities.

D. High School -- Classroom Instructional Program

1. All teachers should have alternative lesson plans drawn up for blackout period.

2. An entire school schedule may be programmed to provide modular scheduling to cover blackout time.

3. Battery-operated equipment, tape recorders, etc., may be issued on a scheduled basis giving priority to particular needs.

4. Science programs may develop substitute lighting and heating needs, within safety regulations for instructional program.

5. Shops, and others using power equipment, should inventory and plan use of non-power equipment.

E. Junior High and Intermediate School

1. Most recommendations for high schools are applicable to junior highs and intermediate schools.

2. Modular scheduling of classes using power equipment should be scheduled so that those classes do not meet on blackout day. Those classrooms may be interchangeably used for other classes to accommodate schedule.

F. Operation of School Offices

1. Provisions need to be pre-planned to have manually operated equipment (typewriters, time/date stamps, etc.) available for use in essential tasks.

2. Tasks can be planned for effective "pooling" of personnel to accomplish essential tasks, using personnel in areas other than their own assignments where needed.

3. Coffee and lunch breaks can be coordinated to take place during blackout period.

4. Inservice training may be planned for the blackout period.

DIESEL FUEL REDUCTION

You are the chief school administrator of a unified school district of 20,000 students -- 3 high schools, 6 intermediate schools and 16 elementary schools. The district is 18 miles long and 9 miles wide. Sixty percent of your students ride buses -- 79 and 91 passenger diesels. You have just been notified that your diesel and gasoline fuel will be reduced 33 percent effective in 30 days.

Procedures:

1. Superintendent's Administrative Cabinet lists current usage and determines priority. Determine all the facts.
2. Director of Transportation, along with bus drivers, determines ways and changes to bring about a reduction in usage of fuel.
3. An Energy Crisis Council will be formed which will propose solutions.
4. The problem will be presented to the P.T.A. Council to obtain its ideas.
5. Problem is presented to all staff members for suggestions.
6. Communicate with Board of Education.
7. Inform the public through the news media and school notices.
8. Call in outside experts and consultants.
9. Appoint a task force to evaluate all aspects of the effect that it would have on the eduational program.

Modifications and Implementation:

1. Shorten bus runs, consolidate some runs, alter beginning and ending times for school sessions, combine kindergarten classes.
2. Reduce athletic trips and field study trips.
3. Adjust school district boundaries or have interdistrict arrangements.
4. Discourage housing developments far from existing routes.
5. Eliminate over limit "warm-up" time for buses.
6. Do not idle engines -- turn them off.
7. Keep engines in good state of repair and adjustment.
8. Use radial tires in place of conventional tires. Maintain proper inflation of tires.
9. Train drivers to drive bus in manner most efficient for operation.

10. Decentralize housing for buses. Don't come in at night, eliminate "dead-head" miles.

11. Increase walking distance. Eliminate busing for integration.

12. Eliminate staggered sessions.

13. When buying buses, go to larger ones. Contract with parents to transport special education students.

14. Review pickup points for special education students.

15. Consolidate pickup for high, junior high, and elementary school students.

16. Establish four-day week schools.

17. Close school in winter months and run them in summer.

18. Have high school students make up car pools.

19. Use cheaper operating station wagons to make long distance runs.

20. Schedule routes and trips more efficiently.

21. Extend riding time for pupils when number of riders is small.

22. Reduce number of bus stops.

GASOLINE REDUCTION

You are the chief school administrator of a unified district of 31,00 students in the Oakland area – 5 high schools, 10 junior high schools and 24 elementary schools. You have just been notified that your gasoline supply for trucks, tractors, mowers, edgers, etc., will be reduced by 50 percent effective in 30 days.

Procedures:

1. Superintendent's Administrative Cabinet lists current usage and determines priority. Determines all the facts.
2. An Energy Crisis Council will be formed who will propose solutions.
3. The problem will be presented to the P.T.A. Council to obtain their ideas.
4. Present problem to all staff members for suggestions.
5. Communicate with Board of Education.
6. Inform the public through the news media and school notices.
7. Call in outside experts and consultants.
8. Appoint a task force to evaluate all aspects of the effect that it would have on the educational program.

Modifications and Implementation:

1. Take a look at alternative fuels; propane, diesel, etc.
2. Check the efficiency of the various pieces of equipment that use gasoline.
3. Change the frequency when supplies are delivered to schools. Once a month instead of twice a month or weekly.
4. Take a look at district operated vehicles:
   a. to see if compact cars could be used.
   b. abstain from using district owned cars; have each employee use his own.
5. Examine the possibility of buying gasoline at a service station on a district-owned credit card.
6. Check possibility of contracting some of the services to an outside contractor who may not have a shortage of gasoline.
7. Make sure all equipment is properly tuned-up.
8. Explore the idea of setting up a dispatcher system so that maintenance crews would not be making duplicate trips to various schools.

NATURAL GAS REDUCTION

You are the chief school administrator of a unified school district of 15,000 students -- 2 high schools, 4 intermediate schools and 12 elementary schools. Sixty percent of your students ride buses. Seventy percent of your schools are less than 15 years old, air conditioned, with a minimum of exterior lighting. Heating in the schools is by natural gas. You have just been notified that your natural gas supply will be reduced by 30 percent effective in 30 days.

Processes:

1. Identify participants in solving the problem.
2. Hold discussions with Central Office Cabinet, principals, and other school personnel.
3. Conduct brainstorming and feedback exercises.
4. Obtain professional advice from Gas Company respresentatives, contractors, and consultants.
5. Conduct public meetings to inform community of the problem and the processes being taken to find a solution.
6. Prepare flyers indicating extent of the problem and possible atlernative solutions.
7. Conduct community programs to receive comments and suggestions from parents, students, and the community-at-large.

Modifications:

A. Immediate

1. Establish educational priorities.
2. Stress conservation and cooperation.
3. Improve maintenance.
4. Lock thermostats.
5. Develop cold meal program.
6. Turn off swimming pool heating.
7. Reschedule classes; physical education classes back to back.
8. Stop community use of facilities.
9. Curtail athletic programs.

B. Intermediate

1. Enclose swimming pools.
2. Install insulation in ceilings.
3. Double glaze windows.
4. Reflective coating on windows.
5. Rearrange school schedule, i.e. year around school.
6. Eliminate winter session.
7. Reload classrooms to larger class size.
8. Eliminate luxury courses.
9. Repaint classroom to warmer colors.
10. Close portion of the school facilities.

C. Long Range

1. Install combination solar/gas heat.
2. Institute "heat ourselves" rather than our environment program.
3. New construction and modification of current facilities to eliminate windows and other heat loss.

D. Implementation of Plan:

1. Develop Comprehensive District Policy on how to cope with reduction of gas supply.
2. Develop a priority of natural gas usage in the district.
3. Create a committee approach to reducing natural gas consumption throughout the entire school district utilizing district administrators, principals, teachers, and classified personnel.
4. Institute an intensive maintenance and control program.
5. Participate actively in seeking alternative substitute energy sources.
6. Modify school calendars during periods of extremely inclement weather.
7. Provide inservice training for school staffs relative to energy.
8. Institute program of close cooperation with Gas Company representatives regarding potential energy savings.

9. Centralize natural gas consumption activities, i.e. food preparation, community service offerings, adult education programs, recreation activities.

E. Special Considerations

1. There must not be major operational differences between school districts within the county.

2. The people are very well informed by the media on the need and method of conservation and expect the schools to exert a leadership role.

3. The thirty to forty year designed life of school facilities must in the future provide for the possibility of the necessity of changing the energy source.

4. The problem of community support of the schools in place of program reductions extends beyond the basic program of education impact to the total program offered through school facilities including community services, adult education and recreation programs.

INCREASE IN BUS RIDERS

You are the chief school administrator of a high school district of 18,000 students -- seven high schools and one continuation school. The district is approximately 24 miles long and 18 miles wide. Sixty percent of the students are qualified to ride buses, but because of the affluency of the district only 40 percent ride. The remaining 20 percent of eligible bus riders have their own cars or are brought to school by parents. You have just been notified that gas rationing will go into effect in 30 days and no gasoline will be available for student or parent cars for home to school driving. You anticipate that the majority of these students will use your already full buses.

Procedures:

1. Form a committee involving teachers, parents, board members, students, and transportation personnel to study and seek solutions to the problem.

2. Involve parents and community.

3. Seek legislative changes to permit better utilization of buses.

Modifications and Implementation:

1. Adjust school time – stagger starting schedules to obtain better utilization of buses.

2. Regulate after school activities to free buses.

3. Consider four-day school week, increased length of school day, year around school.

4. Consider no summer school or have summer school in neighborhood areas only.

5. Consolidate athletic programs.

6. Examine extra and co- curricular programs as well as interscholastic activities. Curtail tnese programs to make buses available for home-to-school transportation.

7. Cluster pickup stops.

8. Disburse special classes, use area classrooms.

9. Coordinate bus schedules with elementary schedules.

10. Coordinate school transportation with public transportation. Use public transportation where possible.

11. Make route studies to ensure maximum utilization of equipment.

12. Use bus contractors if available.

DELAY IN INSTRUCTIONAL SUPPLIES

You are the chief school administrator of a unified district of 18,000 students -- 3 high schools, 6 intermediate schools and 15 elementary schools. You currently have virtually no warehouse space. On May 15 you received notice from your major suppliers of consumable classroom instructional supplies that the anticipated August 15 delivery date would now be November 23 -- and in quantities of 70 percent of your orders. All other sources of supplies are closed to the district.

Modification and Implementation:

1. Conduct a complete inventory of district to determine where oversupplies may exist.
2. Share data with neighboring districts; trade supplies with them if possible.
3. Establish a conservation program -- include students, staff.
4. Group ideas into immediate and long-range plans.
5. Research other sources of supply for temporary purchases.
6. Have students and parents purchase materials.
7. Consider delay in opening of school for a period of time.
8. Develop inservice for teachers to change techniques -- more oral presentations, etc.
9. Use both sides of paper, utilize unused notices, etc.
10. Solicit materials from parents, industry, etc.
11. Substitute a lower quality or off sizes of material.
12. Assess needs on a multi-district basis, buy larger lots.
13. Have shop classes make teaching materials for classes.
14. Sell pencils and paper to students on a "volunteer" basis.
15. Use transparencies for assignments to replace paper used.
16. Provide adequate maintenance of all machines to reduce waste.
17. Increase warehouse space for future insurance.
18. Collect all supplies and re-issue on an emergency basis.
19. Pay a higher price if necessary to source of needed materials.
20. Attempt to change legal basis of furnishing materials so parents can supply needs.

21. Schedule as many field trips as possible for this period of time.

22. Make do . . . . do without.

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PROGRAM

THE ENERGY CRISIS IN THE PUBLIC SCHOOLS: ALTERNATIVE SOLUTIONS

7:30 a.m.	Breakfast with Task Force Facilitators and Problem-Solving Leaders
9:00 - 9:30	Coffee
9:30 - 9:40	Workshop Overview - Dr. James F. Cowan, Ventura County Superintendent of Schools
9:40 - 10:10	Petroleum Shortage and Its Effect on the Public Schools - Mr. J. L. Pauley, Getty Oil Company
10:10 - 10:50	Natural Gas Shortage and Its Effect on the Public Schools - Mr. Bill Cross, Southern California Gas Company
10:50 - 11:05	Break
11:05 - 11:45	Electrical Power Shortage and Its Effect on the Public Schools - Mr. Jack Morrison, Southern California Edison Company
12:00 - 1:00	Lunch
1:00 - 1:30	Problem-Solving and Brainstorming Guidelines - Mr. William Shaffer and Dr. Wilmar Grossbach
1:30 - 3:30	Task Forces on Energy-Conserving Ideas and Small Group Sessions on Problem-Solving
3:30 - 4:30	Meeting of Problem-Solving Leaders and Task Force Facilitators

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PARTICIPATING SCHOOL DISTRICTS AND INDUSTRIES

VENTURA COUNTY

Briggs School District
Hueneme School District
Mesa Union School District
Moorpark Union School District
Mupu School District
Ocean View School District
Oxnard Elementary School District
Pleasant Valley School District
Rio School District
Santa Clara School District
Santa Paula School District
Somis Union School District
Timber School District
Valley Oaks Union School District
Fillmore Unified School District
Conejo Valley Unified School District
Ojai Unified School District
Simi Valley Unified School District
Ventura Unified School District
Moorpark Memorial Union High School District
Oxnard Union High School District
Santa Paula Union High School District
Ventura County Superintendent of Schools Office
Ventura County Community College District

SANTA BARBARA COUNTY

Carpinteria Unified School District
Goleta Union School District
Lompoc Unified School District
Santa Barbara School District
Santa Barbara City College
Santa Maria School District
Santa Maria Joint Union High School District
Santa Barbara County Superintendent of Schools Office

INDUSTRY

Getty Oil Company
Southern California Gas Company
Southern California Edison Company

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PARTICIPANTS

TASK FORCES

Transportation of Pupils

Charles Honn, Co-Chairman - Pleasant Valley School Dsitrict
Doran Tregarthen, Co-Chairman - Oxnard School District

Dr. Walter Condley, Moorpark Memorial Union High School District
Dr. John Wolfe, Ventura Unified School Dsitrict
Edward Kessler, Thelma Bedell School, Santa Paula School District
Frank Smith, Simi Valley Unified School District
Keith Benefield, Newbury Park High School, Oxnard Union High School District

Other Types of Fuel Consuming Transportation

Charles Magill, Co-Chairman - Moorpark School District
John Mudge, Co-Chairman - Santa Maria School District

Frank Hurt, Fillmore Unified School District
Richard Craven, Ramona School, Oxnard School District
Robert Eyre, Santa Barbara City College
Vince Didomizio, Rio School District
Mrs. Carmen Armstrong, Newbury Park High School, Oxnard Union High School District

Administration, Offices & Plant

Dr. Donald Slezak, Co-Chairman - Valley Oaks Union School District
Dr. Lorenzo Dall'Armi, Co-Chairman - Santa Barbara County Superintendent of Schools

Dr. Harold Lipman, Simi Valley Unified School District
Dr. Robert Marcus, Simi Valley Unified School District
Guy Spracklen, Ladera School, Valley Oaks Union School District
Ken Kaufmann, Oxnard School District
Robert Cousar, Buena High School, Ventura Unified School District
Everett Herron, Belwood School, Simi Valley Unified School District
Robert McDonald, Royal High School, Simi Valley Unified School District
Robert Tripp, Rio School District
Hal Smith, Oxnard High School, Oxnard Union High School District
Davis McCamy, Sinaloa Junior High School, Simi Valley Unified School District

Regular Classrooms

Dr. Peter Pinkerton, Chairman - Ventura County Superintendent of Schools

Dr. Allan Jacobs, Simi Valley Unified School District
Joe Mendoza, Oxnard School District
Jeniece Buckley, McKevett School, Santa Paula School District
John Cowart, Ventura High School, Ventura Unified School District
Darrel E. McMahan, Santa Paula Union High School
Tom Carmody, El Camino School, Ventura Unified School District
Bill Calkins, Oxnard Union High School District
James Buchanan, Oxnard High School, Oxnard Union High School District

Classroom Uses Outside of Regular School Day

Roy Marrs, Chairman - Ocean View School District

Dr. Donald K. Sorsabal, Santa Barbara Community College
Orlando Caputo, Sheridan Way School, Ventura Unified School District
Ted Owens, Ocean View School District
Gerald Cummins, Santa Ana School, Ventura Unified School District
Lino Mautino, Santa Barbara County Superintendent of Schools
Donald Jansen, Adolfo Camarillo High School, Oxnard Union High School District
William Seaver, Thousand Oaks High School, Oxnard Union High School District
Mrs. Elizabeth Rutherford, Pleasant Valley School District Board
Charles Gibson, Moorpark College
Jan Rhoads, P.T.A. Representative

Specialized Classrooms

Dr. Wilber Wheaton, Chairman - Santa Maria Joint Union High School District

Dr. Arthur H. North, Santa Barbara City School District
Ruben Navarro, Oxnard Union High School District
Chester Kleveland, Santa Paula School District
Dr. David Baarstad, Ventura Unified School District
Walter Zorovich, Buena High School, Ventura Unified School District
Morris Crecelius, Matilija Junior High School, Ojai Unified School District
Jack Richards, La Colina Junior High School, Santa Barbara
Mrs. Jennifer Short, Royal High School, Simi Valley Unified School District
Daniel Blumenshine, Royal High School, Simi Valley Unified School District
Mrs. Dorothy Palmer, Simi Valley High School, Simi Valley Unified School District
Robert Fischer, Simi Valley High School, Simi Valley Unified School District
Dr. John Renard, Adult Education, Oxnard High School

Extra Curricular Activities

C. William Sciutto, Chairman - Santa Paula Union High School District

George Smith, Santa Ynez Valley Union High School District
Mel Wilde, Lompoc Unified School District
Harry Myers, Ventura County Community College District
Robert Swanson, Ventura High School, Ventura Unified School District
Erle Whiting, Fremont Junior High School, Oxnard School District
Miss Bobbie Diehl, Rio Mesa High School, Oxnard Union High School District
Darlene Benz, Channel Islands Bus System
Tim Piatt, Simi Valley High School, Simi Valley Unified School District
Robert Spielman, Royal High School, Simi Valley Unified School District
Bill Putman, Fillmore Unified School District

Maintenance, Operations & Grounds

Lewis John, Chairman - Oxnard Union High School District

Karl Grahn, Santa Barbara City School District
Charles Turk, Rio School District
Morris Weber, Rio School District
Ralph Henson, Valley Oaks Union School District

Earl Carter, El Camino School, Santa Barbara School District
Tom Smith, Avenue School, Ventura Unified School District
Alex Godinez, Rio School District
Gerald Neff, Orcutt Union Elementary

Food Services

Arthur Doornbos, Chairman - Timber School District

Robert Duff, Carpinteria Unified School District
Milo Spracklen, Los Nogales School, Pleasant Valley School District
Gene Snyder, Santa Barbara High School
Mrs. Ellen Parshley, Valley Oaks Union School District
Mrs. Virginia Jones, Oxnard School District
Peter Rogalsky, Sycamore School, Simi Valley Unified School District
Mrs. Dolly Swor, Rio School District
Robert Sorensen, Oxnard High School, Oxnard Union High School District
Mildred Clark, Fillmore Unified School District

PROBLEM SOLVING GROUPS

Reduction in Electrical Power

Dr. William Carty, Co-Chairman - Carpinteria Unified School District
Dr. Charles Slaughter, Co-Chairman - Santa Paula School District

Roy Ash, Pleasant Valley School District
James Ingersoll, Kamala School, Oxnard School District
Duane Owens, Nordhoff High School, Ojai Unified School District
Mrs. Lois Shaffer, Buena High School, Ventura Unified School District
Jack Morrison, Southern California Edison Company
Dave Evans, Southern California Edison Company
Dr. Stanley McDougall, Bureau of Management Services, State Department of Education
Carol Welsh, Thousand Oaks High School, Oxnard Union High School District
William Grist, Ventura County Executive's Office
Eugene Arnoldi, Bonita Elementary, Santa Maria School District
Edward Geis, Mupu School District

Gasoline Reduction

Dr. Walter Ziegler, Chairman - Simi Valley Unified School District

Fred Nightingale, Ojai Unified School District
Richard Johnson, Sequoia Intermediate School, Timber School District
George Hatcher, University School, Valley Oaks Union School District
William Dudash, Santa Barbara County Superintendent of Schools
R.J. Hamilton, Getty Oil Company
Dr. Wayne Butterbaugh, Conejo Valley Unified School District

Diesel Fuel Reduction

Dr. Patrick Rooney, Chairman - Ventura Unified School District

Clinton Tracy, Acacia School, Timber School District

Bernard Baumgartner, Rose Avenue School, Oxnard School District
Peter Dworkis, Cal-Coast Charter
P.D. Gundelfinger, Getty Oil Company
Hugh Price Germany, Rio School District
Orlando Merrill, Orcutt Union Elementary School District
J. Pauley, Getty Oil Company

Blackouts

Andy McEuen, Chairman - Oxnard Union High School District

Dr. Wayne Templeton, Simi Valley Unified School District
Dr. William Purdom, Ojai Unified School District
John Stivers, Timber School District
Dr. Jackson Partin, Ventura High School, Ventura Unified School District
Arnold Erickson, Topa Topa School, Ojai Unified School District
Paul Pierce, Mound School, Ventura Unified School District
Nester Valdes, Southern California Edison Company
Gary Nasalroad, Southern California Edison Company
Mrs. Donna Sterling, Channel Islands High School, Oxnard Union High School District
Peggy Lawyer, Adolfo Camarillo High School, Oxnard Union High School District

Delay in Instructional Supplies

Jack Tevault, Chairman - Briggs School District

Norman Brekke, Oxnard School District
Dennis Lee, Timber School District
Dr. John Sugden, Ventura Unified School District
Ivan Millhollin, Don Juan Bautista Arellanes Elementary, Santa Maria
William Rife, Royal High School, Simi Valley Unified School District
Alan Kay, Simi Valley High School, Simi Valley Unified School District
Dr. A. W. McConnell, Buena High School, Ventura Unified School District
Charles Clark, Colina Intermediate School, Valley Oaks Union School District
William Schoenbach, Arnaz School, Ventura Unified School District
Ronald Wise, Channel Islands High School, Oxnard Union High School District

Increase in Bus Riders

Kenneth Wade, Chairman - Ojai Unified School District

S. H. Stewart, Oxnard School District
Frank Rodriguez, Juanita School, Oxnard School District
George Blek, Monte Vista Intermediate School, Pleasant Valley School District
Kenneth Almeida, Knolls School, Simi Valley Unified School District
Mrs. Ina Thompson, Simi Valley Unified School District
Carl Benz, Channel Islands Bus System
Steve Stocks, Channel Islands High School, Oxnard Union High School District
Dave Gurrola, Fillmore Unified School District

Natural Gas Reduction

Dr. Earl Tuthill, Chairman - Mesa Union School District

Dr. Robert Karayan, Hueneme School District
Carl Doerfler, Banyan School, Timber School District
William McKinney, Ventura High School, Ventura Unified School District

Philip Hawthorne, Ventura County Association of Governments
Bill Cross, Southern California Gas Company
Oscar Johnson, Southern California Gas Company

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